AMERICAN GAS JOURNAL

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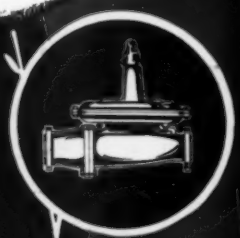

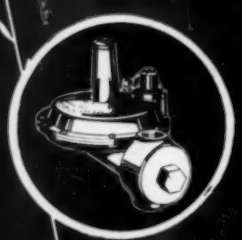

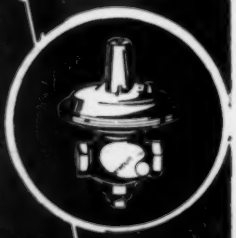

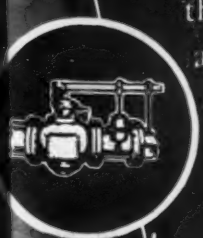

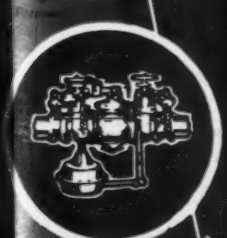

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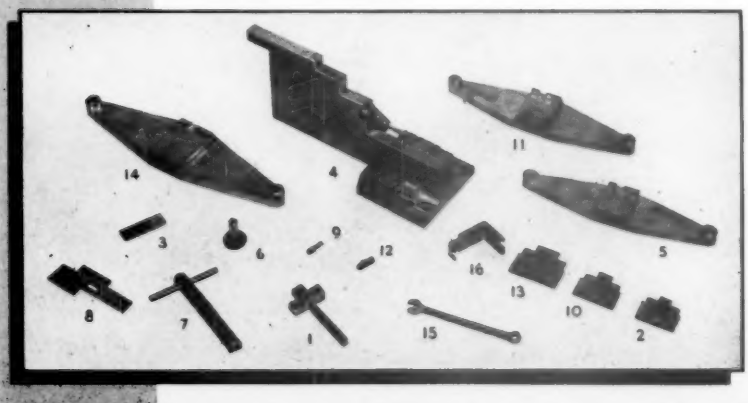

DURING the present emergency you may not be able to secure all the new meters that would normally be required for your expanded operations. Meter repair and maintenance work must, therefore, be done on a scale never before attempted. Here is where the inbuilt extras in EMCO Meters really prove their worth, for these meters have been designed with lasting qualities that provide high performance standards even after serving their normal life span.

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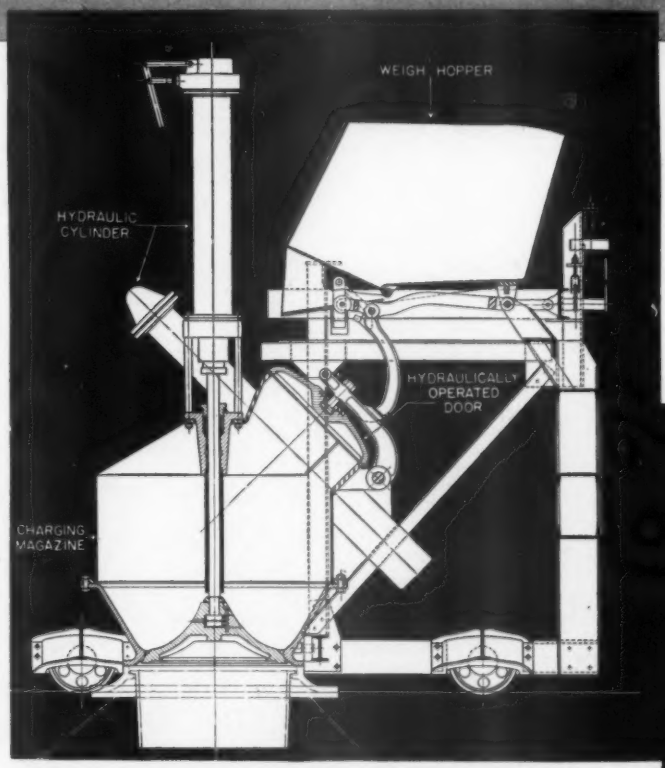

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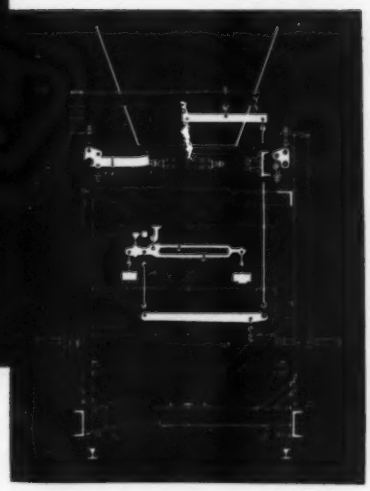

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40 Rector Street New York, N. Y.

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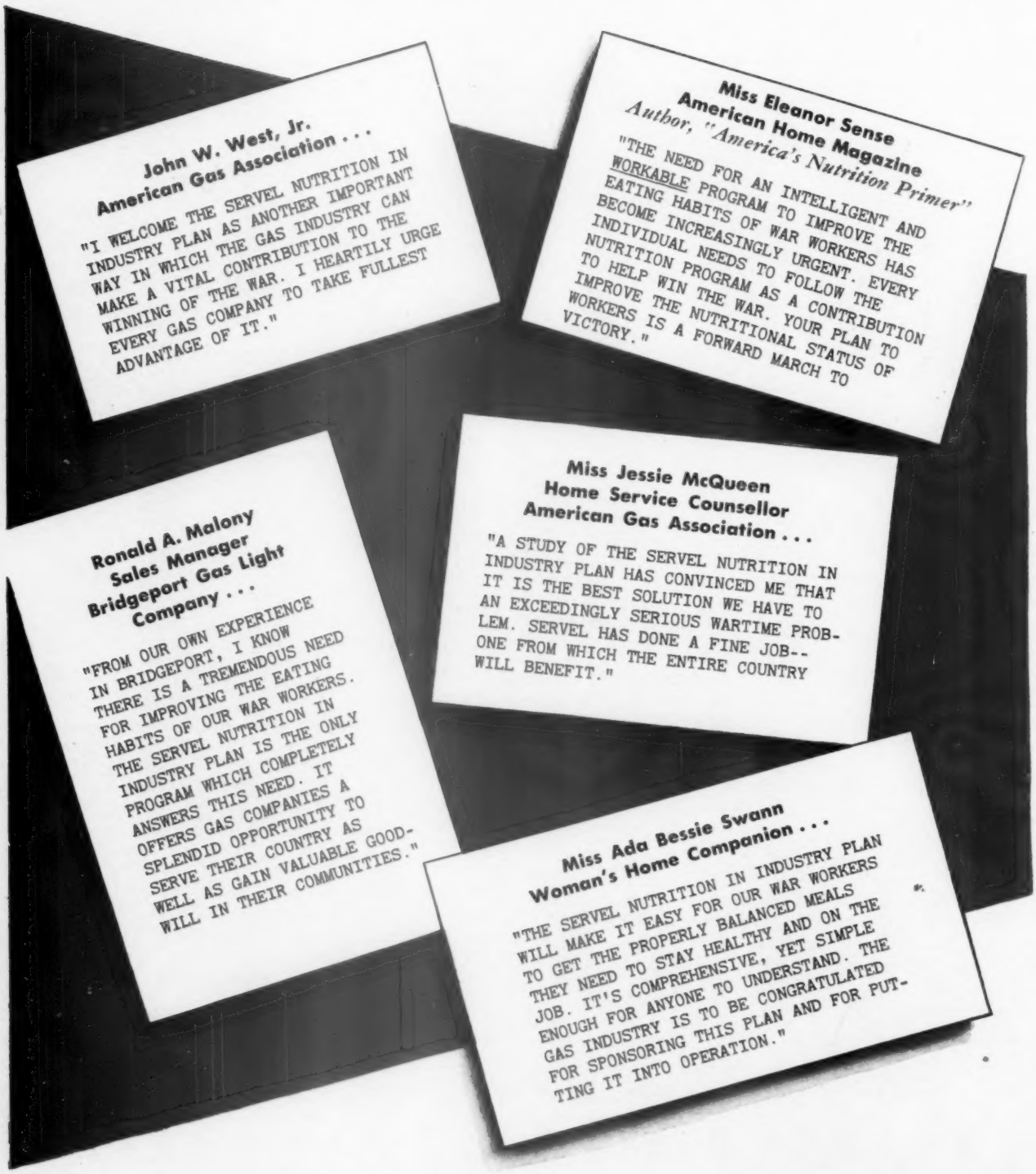
Editors . . . Nutrition Experts

Praise Nutrition


John W. West, Jr.
American Gas Association . . .
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American Home Magazine
Author, "America's Nutrition Primer"
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. . . as a simple, practical way to save vital man-hours, speed production in America's war plants!

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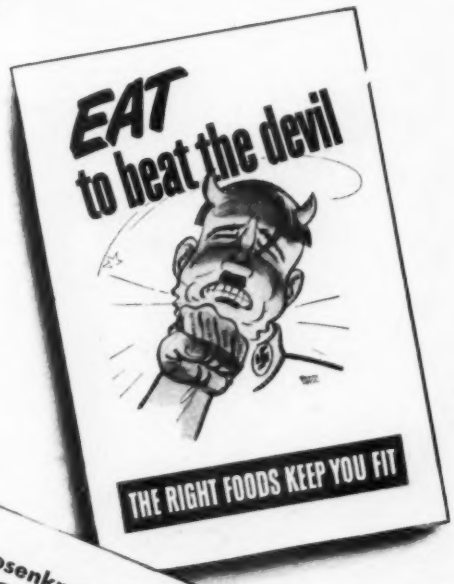

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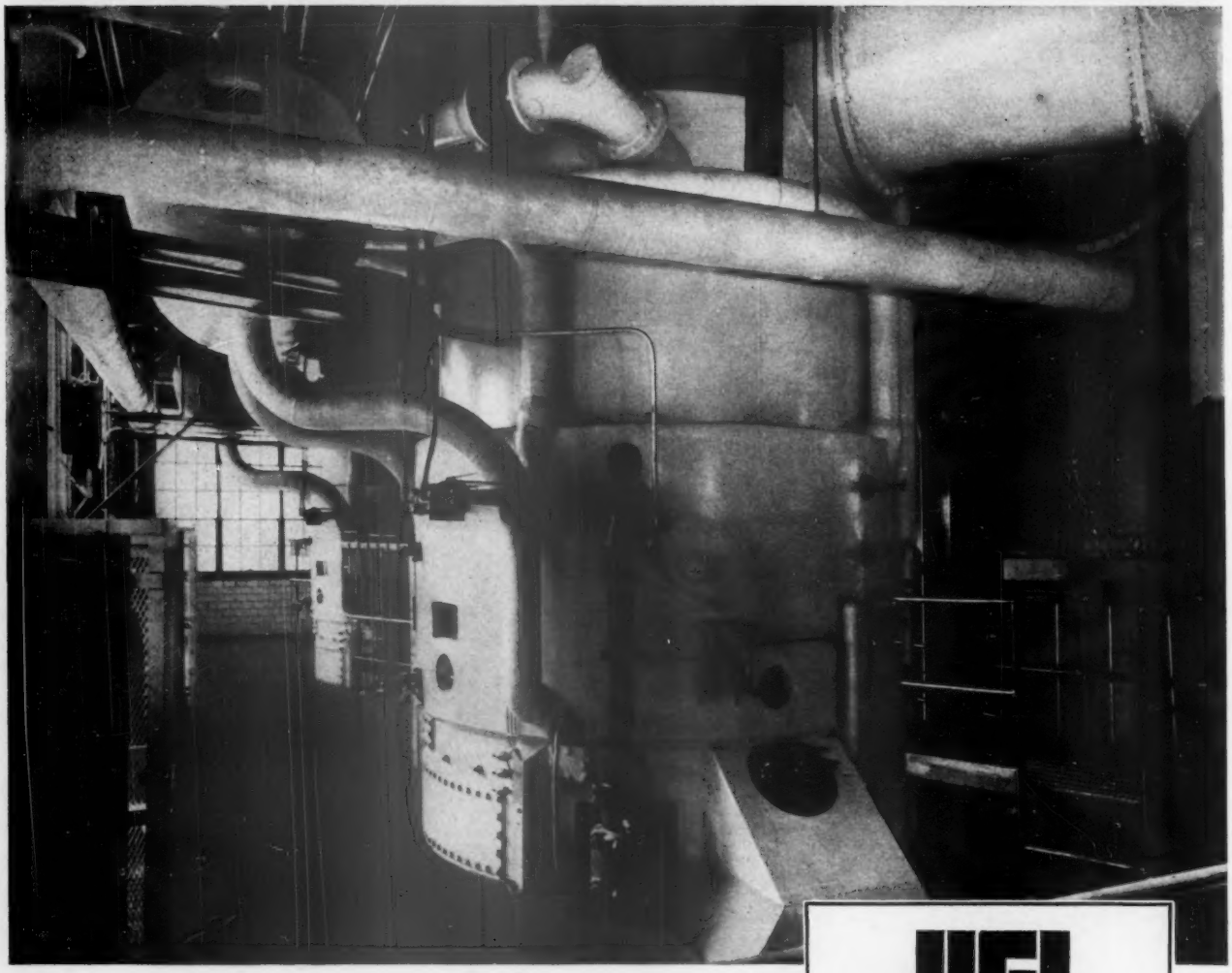

Model "D" is the latest development of the U. G. I. Mechanical Generator. Four U. G. I. Model "D" Mechanical Generators are now in operation and one is on order. The operating features and advantages of the Model "B"—of which 94 are installed or under construction—have been retained.

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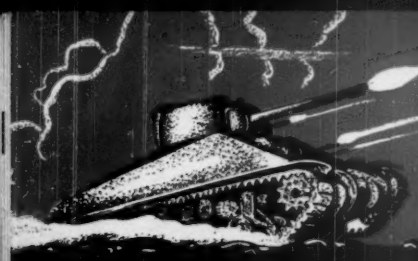

OUR Second Front

"Popular Household" by Floyd [illegible], Plant Supt. of the [illegible] Gas Light Co., Albion, [illegible]. One of the prize [illegible] in the Connelly Photo [illegible].

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Connelly IRON SPONGE

Connelly IRON SPONGE and GOVERNOR COMPANY

CHICAGO, ILL. ELIZABETH, N. J.

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NUMBER 4

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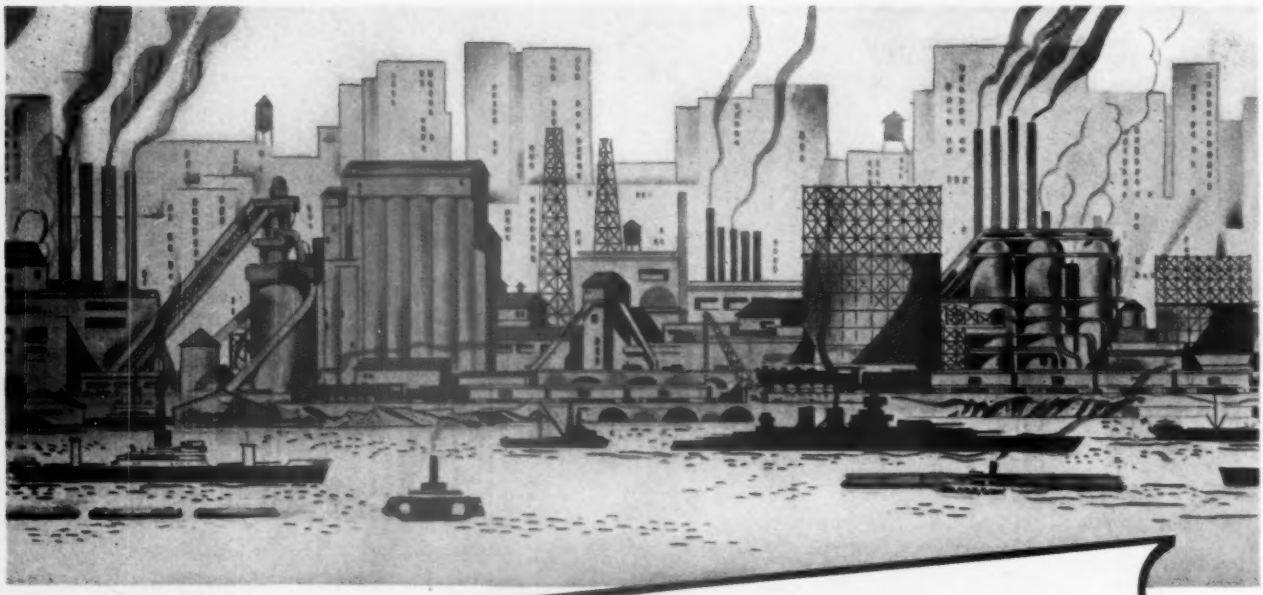


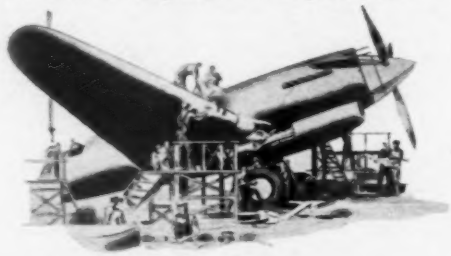
VICTORY will be the Sum of Big and Small Contributions

THE CHIEF TASK of American Meter Company and other manufacturers will be the extensive fabrication of war implements . . . till Victory is won.

Meantime, the factories of this company and its engineering services will exert every effort to aid its gas company customers in the maintenance of the millions of "AMERICAN" meters now measuring gas to residential and industrial consumers.

New meters and maintenance repair parts will continue to be manufactured wherever and whenever this is possible without interference of the priority regulations in force to aid war production schedules.

Critical materials must be conserved wherever their use can be dispensed with. Less essential needs must yield a quota . . . here, there, everywhere . . . even in "essential" manufactures and services. In the aggregate, these savings can give a decided impetus to war production.



AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

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OCTOBER
1942

AMERICAN
GAS JOURNAL

VOLUME 157
NO. 4

Reassembling Gas Meters With Low Tin Content Solders

By
C. P. Xenis
and
A. F. Kochendorfer
Consolidated Edison Company
of New York, Inc.

THE TIN CONSERVATION orders of the War Production Board specify substantial reductions in the tin content of solders used in repairing and reassembling gas meters as well as other soldering applications. The Consolidated Edison Company of New York, Inc., has carried out a development and test program to find a low tin content solder formula for gas meters, which will

a) meet the requirements of the War Production Board as to tin content:
b) permit the reassembly of meters without undue mechanical diffities:
c) result in the net saving of tin per meter reassembled:
d) result in a meter assembly capable of giving safe field operation.

Experience with two solder formulae (a) 30% tin, 68.1% lead, 1.8% antimony, .1% arsenic and (b) 30% tin, 2% antimony, 68% lead, leads us to believe that these requirements have been met reasonably well. It is of course impossible to predict accurately its long range performance in the field, nor can we await the results of extensive field operation before we start conserving tin. Accelerated life tests under vibration, heating and cooling cycles above normal pressures, etc., were applied on meters assembled with these proposed low tin content solders as well as the conventional 50% tin-50% lead solder, to provide a comparison with a known standard. Such detailed comparisons as outlined below were the basis for predicting the probable long range adequacy of the proposed formula.

The solder recommended (30% tin, 2% antimony, 68% lead) is the best we have found to date. It is hoped that other investigators of the problem will check our findings as well as try other formulae. It should be remembered, however, that when a new solder is issued to the meter shop, the results will at first be disap-

TABLE (I)
SUMMARY OF SOLDER FORMULAE INVESTIGATED

	Solder Designation	Solder Composition: Tin	Lead	Silver	Antimony	Bismuth	Arsenic	Liquidus Temp. °F.	Qualities by Tinning	Inspection Joint
1	F1	30	66.75	1.25	2.0	—	—	480	Fair	Slightly White
2	F4	30	66.95	1.25	1.8	—	—	480	Fair	" "
3	F3	30	66.75	1.25	1.0	—	—	480	Fair	" "
4	F2	30	66.75	1.25	0.5	0.5	—	480	Fair	Cracks
5	B383	30	68.5	1.5	—	—	—	461	Poor	"
6	500	30	65	1.5	0.5	3.0	—	—	Fair	"
7	B378	27	71.5	1.5	—	—	—	475	Poor	"
8	468	20	75	1.5	0.5	3.0	—	—	Fair	White
9	585	5	93.5	1.5	—	—	—	585	Poor	Dull & Rough
10	I	25	72.7	—	2.3	—	—	—	Fair	Cracks
11	II	25	73	—	2.0	—	—	—	Fair	Cracks
12	III	27	70.7	—	2.3	—	—	—	Fair	Slightly White
13	IV	27	71	—	2.0	—	—	—	Fair	Cracks
14	B385	30	68.5	—	1.5	—	—	477	Fair	Clean
15	B385 AR	30	68.3	—	1.5	—	0.1	480	Fair	Cracks
16	B384	30	68.2	—	1.8	—	—	473	Fair	Slightly White
17	B372	30	68.1	—	1.8	—	0.1	484	Good	" "
18	B386	30	68	—	2.0	—	—	469	Good	Clean
19	MB 2.1	30	67.9	—	2.1	—	—	—	Good	Slightly White
20	MB 2.2	30	67.8	—	2.2	—	—	—	Good	" "
21	B395	30	67.7	—	2.3	—	—	467	Good	" "
22	B396	30	67.4	—	2.6	—	—	464	Good	Cracks
23	5	—	97.5	2.5	—	—	—	—	Poor	Rough
24	50/50	50	50	—	—	—	—	412	Very Good	Clean
25	38/62	38	62	—	—	—	—	462	Very Good	"
26	30/70	30	70	—	—	—	—	500	Poor	Cracks

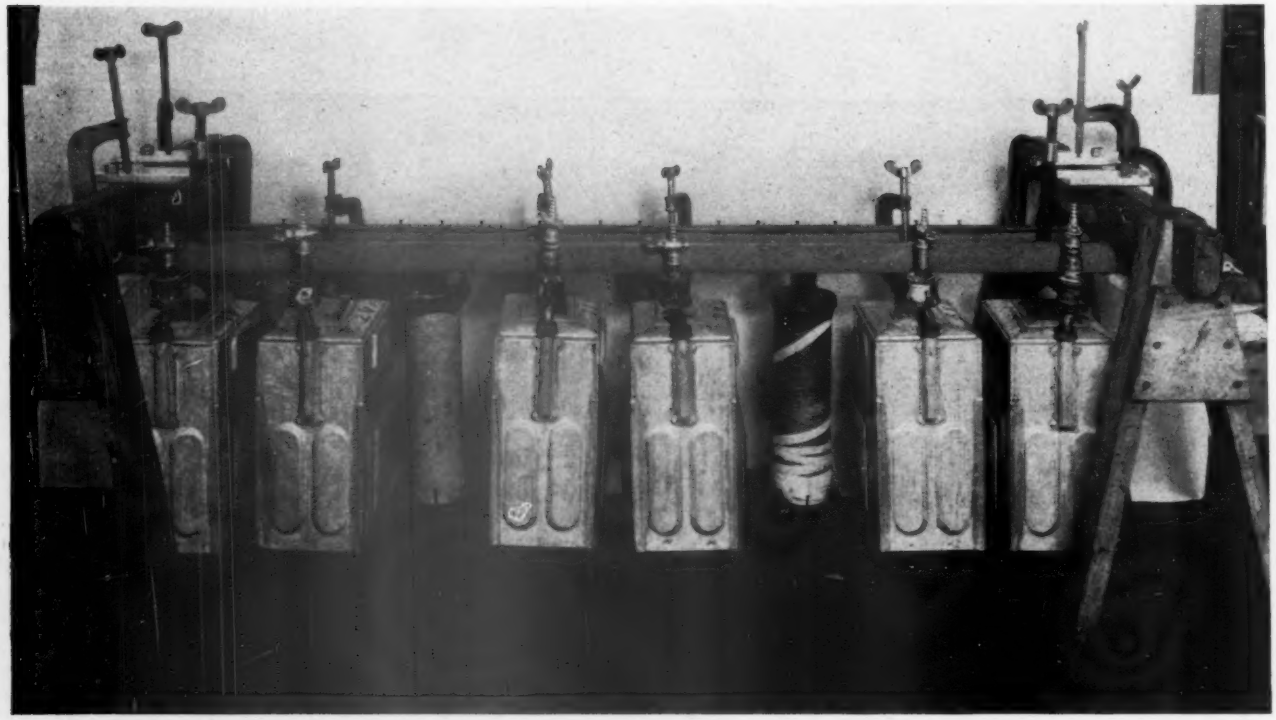

Figure 1: Vibration Test Arrangement.

pointing until the long established practice adapted to the use of the 50% tin-50% lead solder are adjusted to yield the optimum results with the specific formula being adopted.

Various Solder Formulae Tested

A large number of solder formulae were investigated in order to select the most satisfactory one. This work consisted of assembling meters, using the various formulae and observing the results obtained. The various solder formulae were submitted by manufacturers as being worth investigating and when any one formula appeared at all promising the manufacturers were asked to submit additional samples slightly varying some of the critical elements in order to obtain more satisfactory results. Table No. 1 lists 26 solders thus investigated and the results obtained. It should be realized that these investigations were limited to small samples and while they enabled us to select the low tin content formulae items 17 and 18 which ultimately proved the most satisfactory with normal meter shop tools, we are not prepared to say that some of the other formulae if further explored might not yield satisfactory results.

Table No. II gives the results of bond strength tests on various solder formulae used with different fluxes. It reveals that the grease flux now in use gave as favorable results with the 30% tin 2% antimony 68% lead solder as any of the other fluxes under test.

Vibration Tests

The set-up illustrated in Fig. 1 shows the assembly of equipment used to determine the effect of vibration on meters assembled with solders of the following compositions:

	No. of Meters	No. of Hours on Test	No. of Leaks
50% Tin 50% Lead	2	1900	None
30% Tin 68.1% Lead 1.8% Antimony 0.1% Arsenic	2	1900	None
30% Tin 68% Lead 2% Antimony	(2 (6	1700 1450	None None

The beam on which the meters are mounted is vibrated by means of two solenoids at a frequency of 50 cycles per second with an amplitude of 0.005 of an inch. The meters are tested under pressure daily to locate leaks and while this test has not revealed any leaks to date, the two meters assembled with 50% tin and 50% lead solder, and one meter assembled with 30% tin, 1.8% antimony, 68.1% lead, 0.1% arsenic solder show signs of cracking. The water entering these slight cracks during the daily water immersion test under pressure to locate leaks has started a small amount of corrosion at these cracks. The results obtained on this as well as other tests on the two formulae of solder namely, (a) 30% tin, 1.8% antimony, 68.1% lead, .1% arsenic, and (b) 30% tin, 68% lead, 2% antimony are so similar that as far as we can tell the two formulae should give about the same long range performance.

Heating and Cooling Tests

The results of the heating and cooling tests are given in Table III and the equipment used for this test is shown in Figs. 2 and 3. The test consisted of setting the pressure at 0.4 pounds per square inch at room temperature and heating the meters to 80 degrees Centigrade for approximately one hour with a resulting increase in pressure. The meters were then tested for leaks by immersion in water with the meter pressure set at 0.9 pounds per square inch. The pressure was then increased to 2.3 pounds per square inch and the meters placed in the refrigerator at minus 5 to minus 10 degrees Centigrade for approximately 1½ hours. When the meters attained this temperature they were retested at 0.9 pounds per square inch for leaks and then prepared for another heating cycle. The meters were subjected to these heating and cooling cycles until a leak developed. The recommended formulae of low tin content solders, namely 30% tin, 68.1% lead, 1.8% antimony, 0.1% arsenic, and 30% tin, 2% antimony, 68% lead give better results on this test than those obtained with the conventional

Figure 2: Refrigerator Used for Cooling Test.

50% tin-50% lead solders. These tests indicate that long range performance in the field will be satisfactory with these low tin content solders and may be better than obtained with the 50% tin-50% lead solders.

The 38% tin 62% lead solder is shown by this test to be somewhat inferior to the 50% tin—50% lead solder failing at an average of 37 cycles. It is felt that unless field experience can be found to prove the acceptability of this solder, its performance on this test might justifiably raise a question as to its long range performance in the field.

Shop Experience

Approximately, 60,000 meters have been assembled using the two formulae a) 30% tin, 68.1% lead, 1.8% antimony, 0.1% arsenic (b) 30% tin, 68% lead, 2% antimony. The test results on these solders are very similar and our choice in favor of the latter has been made on the basis that it is easier to mix and control locally when converting 50% tin-50% lead solder.

When the new formulae were at first used in the shop, production work dropped by about 25 percent, but as the men continued to use these solders they improved their production so that now it is less than 5 percent lower than their former production with 50% tin-50% lead solder.

The poundage of solder now used is approximately 8 percent higher than that used with the 50% tin-50% lead formula. Therefore, the net saving in tin per meter reassembled is 35 percent. In the case of the Consolidated Edison Company meter shops the saving in tin will amount to approximately 20,000 pounds per year.

A question pertinent to the use of the proposed low tin formulae is the conversion of 50% tin—50% lead solder from stock or salvaged from meters. Formula (b) 30% tin, 68% lead, 2% antimony can be readily mixed by purchasing a toner metal containing 5% antimony and 95% lead. The composition of the toner metal can be varied to fit the percentage of lead and tin in the solder to be toned. The toning operation requires a melting pot in which temperatures can be reasonably well controlled and the mixer readily agitated. The toner metal and solder to be mixed must be accurately weighed. Unless these facilities are available it is recommended that the toning be done by solder manufacturers who have the personnel and equipment to give good results. No important difference has been found between the use of cast or extruded bars.

Summarized Conclusions

(a) Solder of two low tin content compositions has been found which appear to give acceptable results on test and in the shops.

(b) Appreciable economies in tin will result from the use of the recommended solder formulae.

(c) To use the recommended solders, the shop mechanics require a certain length of time to adjust them-

Figure 3: Oven Used for Heating Test.

TABLE (II)
RESULTS OF BOND STRENGTH TESTS ON VARIOUS SOLDERS

Solder Mix Designation	Composition of the Various Solders Used During Tests—Per Cent						Bond Strength Tests Pounds Per Square Inch of Lapped Area							
							Grease Flux 4 Tests			Acid Flux 2 Tests		Sterine Flux 2 Tests	G.E. Stick Flux 2 Tests	
	Tin	Lead	Silver	Antimony	Bismuth	Arsenic	Min.	Max.	Avg.	A	B	A	A	B
F1	30	66.75	1.25	2.0	—	—	2610*	3250	2880	2650	2770*	3250	3420	—
F4	30	66.95	1.25	1.8	—	—	3210	3640	3350	3090	3140	3050	—	—
F3	30	67.75	1.25	1.0	—	—	2860	3520	3250*	2130	—	3640	2980	—
F2	30	67.75	1.25	0.5	0.5	—	3170	3510	3270	3170	3260	3010	3480	—
B-383	30	68.5	1.5	—	—	—	2860	3300	3040	3220	—	2740	2820	—
500	30	65.0	1.5	0.5	3.0	—	1030	3090	2345	2840	2950	2900	2610	—
B-378	27	71.5	1.5	—	—	—	2610	3040	2780	2770	2940	2730	2870	2900
468	20	75.0	1.5	0.5	3.0	—	2250	2780	2480	2800	—	2560	2590	—
585	5	93.5	1.5	—	—	—	2510	3160	2730	2920	—	2430	1400	—
I	25	72.7	—	2.3	—	—	3320	3360	3340**	3350	3460	3390	—	—
II	25	73.0	—	2.0	—	—	3080	3330	3210*	3540	—	3310	3580	3590
III	27	70.7	—	2.3	—	—	3260	3480	3370**	3220	—	3330	—	—
IV	27	71.0	—	2.0	—	—	3180	3330	3270*	3350	3360	3210	3410	—
B-385	30	68.5	—	1.5	—	—	3070	3290	3200	2970	3210	2870	3090	—
B-385 AR	30	68.4	—	1.5	—	0.1	3010	3260	3130	3240	—	2850	2610	—
B-384	30	68.2	—	1.8	—	—	3110	3280	3170	3290	3360	3110	2960	—
B-372	30	68.1	—	1.8	—	0.1	2790	3320	3010	3540	3630	3210	1150	3060
B-386	30	68.0	—	2.0	—	—	3210	3360	3290	2920	3000	2820	2880	—
B-395	30	67.7	—	2.3	—	—	2530	3330	2950*	2510	2610	2580	2670	3550
B-396	30	67.4	—	2.6	—	—	2640	3280	3020*	2730	—	2870	2780	—
50-50	50	50.0	—	—	—	—	2970	3630	3220*	3010	—	—	2440	—
38-62	38	62.0	—	—	—	—	3060	3150	3100**	2770	3030	3170	3410	—
30-70	30	70.0	—	—	—	—	2850	3550	3200*	2720	3240	2730	—	—

*Three Tests
**Two Tests

selves to the low tin content solders. The results at first are disappointing.

(d) It must not be assumed that the final answer to the problem has been found. It is hoped that other investigators will check the results herein reported and will try other solders of widely varying compositions and possibly other shop tools to the end that the performance obtained may be further improved and possibly greater economies in tin consumption realized.

Appendix

Items Relating to Repairs of Gas Meters Using 30% Tin Content Solder

1. *Fluxes*

(a) For parts that are tinned the following composition flux used liberally has been found to give good results:

Material	*Amount*
Dry Rosin	5 Lbs.
Red Oil (Oleic Acid)	5 Gallons
Diaphragm Oil (Neutral Oil) Corning Oil Company	½ Pint
Socony #2300 Wax	¼ Lb.

Melt rosin and mix with hot red oil.

Dissolve wax in hot neutral oil and mix with red oil and rosin.

(b) The following acid flux is used for corners and untinned parts:

Material	*Amount*
Zinc Chloride	16 Lbs.
Water	1 Gallon

Dissolve zinc chloride in water.

2. *Solder*

The solder compositions on which this procedure is based are:

Material	*Per Cent*
(a) Tin	30.0
Arsenic	0.1
Antimony	1.8
Lead	68.1
(b) Tin	30.0
Antimony	2.0
Lead	68.0

3. *Form of Solder*

¼" x ¼" bar solder either extruded or cast.

4. *Surfaces*

Prior to tinning, meters and parts are thoroughly washed in the usual manner. All surfaces to be soldered are then thoroughly tinned with the solder existing on the meter being repaired. For the tinning operation, the oil flux (1a) specified above is used.

TABLE (III)

RESULTS OF HEATING AND COOLING TESTS ON GAS METERS HAVING SEAMS SOLDERED WITH VARIOUS SOLDERS

Solder Mix Designation and Composition in Per Cent	*Company No. on Meter*	*Cycle No. During Which Failure Occurred*	*No. of Cycles on Test*	*Location of Failure*
			(No Failure)	
F-1	586-909		94	Top seam—corner inlet and front
Tin 30	586-914	20	—	Horizontal seam—back
Lead 66.75	586-916	48	—	
Silver 1.25		—		
Antimony 2.0		34 Avg.		
B-395	588-902	—	48	—
Tin 30	588-831	—	45	—
Lead 67.7	588.894	—	37	—
Antimony 2.3				
B-396	590-346	11	—	Top seam—back
Tin 30	588-828	—	30	—
Lead 67.4	588-794	—	15	
Antimony 2.6				
50-50	C878-187	34	—	Horizontal seam—back
Tin 50	D105-298	94	—	Top seam—inlet
Lead 50	C849-942	21	—	Horizontal seam—back
	W.L.C.	9	—	Top seam—corner, back and inlet
		40 Avg.		
B-372	574-296	220	—	Top seam—front
Tin 30	574-281	39	—	Vertical seam—inlet front
Lead 68.1	574-278	15	—	Horizontal seam—back
Antimony 1.8	574-293	194	—	Horizontal seam—back
Arsenic 0.1	597-731	—	49	—
	597-712	—	49	—
	597-307	—	48	—
		117 Avg.		
B-386	586-727	141	—	Horizontal seam—front
Tin 30	586-731	157	—	Top seam—back
Lead 68.0	586-730	46	—	Top seam—outlet
Antimony 2.0	591-074	95	—	Top seam—back
	591-068	—	168	
	591-071	131	—	Horizontal seam—front
	593-718	18	—	Horizontal seam—back
	591-055	—	166	—
	591-072	150	—	Horizontal seam—back
	591-048	115	—	Top seam—back
		107 Avg.		
B-385	586-732	88	—	Top seam—inlet
Tin 30	586-963	13	—	Top seam—corner inlet and front
Lead 68.5	586-922	110	—	Horizontal seam—back
Antimony 1.5				
		70 Avg.		
38-62	871-827	20	—	Top seam—corner inlet and front
Tin 38	571-433	47	—	Top seam—outlet
Lead 62	570-698	47	—	Top seam—back
	572-101	34	—	Vertical seam—outlet back
		37 Avg.		

5. *Irons*

Two (2) (2½ lbs. each) irons are used alternately. The irons may be tinned with either 50% or 30% tin content solder. If the latter is used the irons will require more frequent tinning.

6. *Seams*

First sweat the seams and on the second application apply a bead as usual. In soldering the seams care should be taken to prevent the heat from spreading far into adjacent metal surfaces in order to prevent cracking as the solder solidifies. Practice in this detail is required in order to enable the meter repairer to perform consistent work.

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Woman's Part in the British Gas Industry

By

Hazel Hunkins Hallinan

In the Retort House of a London gas works, humor holds sway with these women workers.

Photo British Combine

LET ME TELL YOU about one of the changes the War has forced on the Gas Industry in England. From among several gas production plants which I have visited recently, let me tell you about a typical one, one near London, manufacturing millions of feet of gas for distribution to the little homes of the people as well as to the great industries of the nation.

Broadly speaking, an English "gas undertaking," as it is called, looks pretty much like its American opposite, a gas production plant. There are the same big buildings, very dull looking to the layman; the same miles of mysterious piping, large and small; the same chimneys belching smoke and steam; the same gas holders and the same railway tracks crisscrossing among the dirt and concrete roadways. The whistle blows and the shift changes. Crowds of workers appear in overalls and caps. Their faces are dirty and they carry their lunch boxes and their coats.

Then it strikes one that some of those workers are carrying women's coats; that many of those dirty faces are, in fact, women's faces. From under the caps, here and there, one can see a stray curl and in spite of the bib-overalls, an unmistakable femininity.

The employment of women is one of the big changes that has taken place in the Gas Industry in England.

I went with the new shift to the Retort House of this plant. I had been loaned a dust coat and, as I smelt the steam and soot, I drew it more closely over my rationed and irreplaceable clothing which stood in immediate danger of being ruined. Standing at the entrance, I could half-see figures moving in the feeble English sunlight which slid down streams of dust and waged a losing battle with the blaze of fires. Coming in, I could see that these figures were women—women employed in the Retort House.

On one long solid wall of the building were dozens of small ovens. With a long hook a male-worker would open one of the little oven doors and out of the red cavern would pour a niagara of molten coke. It would break, as it fell from a height, scattering the crimson mass into a trough of running water beneath. Hot air struck us like an invisible wall and then as the coals reached the water, a volcano seemed to open. Flames shot up; black smoke ballooned out in all directions enveloping us in grit and soot. It was a girl who pushed a guard in front of the falling coals. It was another girl who swept the scattering coals back into the trough and another girl who managed the spray of water which hastened the cooling.

It has been said that women won't take dirty work. She who managed that foggy inferno was once a saleslady in a fashionable furniture shop. Her face was black with soot and shone with sweat. "It's worse on the night shift," she said. "At night the open side of the Retort House has to be shut to be blacked-out. The air is heavy with soot and stings the throat." Those girls don't have a glamour job. They work eight-hour shifts taking their turn by the week at each of the three shifts including the night shift.

It would be only a slight exaggeration to say that the gas undertakings of England went to bed one night staffed with men and woke up the next morning with half their staff gone. Each succeeding morning they awoke to another large loss of male workers and the demands on their production in no way diminished.

The shortage was first met by recalling all the older men who had been retired on pensions and the former employees over military age. There also existed a pool of unemployed. Casual workers and the unemployed were the first to step into the unskilled jobs while the experienced but unskilled and semi-skilled older men were to some extent stepped-up into the skilled jobs. All the obvious sources of male labor were being drawn on, not only by the gas industry but by all other industries as well and the supply was soon exhausted. The key men in all industries were exempt from conscription and were prohibited from volunteering. In fact, they were tied to their jobs as essential workers by order of the Ministry of Labor. Around these key men, a war-time staff had to be organized.

The only source of labor left was women. The women were not competing for the jobs as much as the jobs were competing for the women. The situation demanded a survey of woman power and accordingly registration of women by age-groups was authorized. It began on April 19th, 1941 with the registration of women born in 1920 and has continued up to the 45 age group this summer. The Government, with no small degree of authority, then proceeded to "direct" unemployed childless women into essential industries. At the same time the Government increased the total number of women available by the compulsory release of younger women from non-essential trades. First, it was the release of young women between the ages of 20 and 25 from

businesses engaged in retail distribution (other than food trades); next they were withdrawn from the light clothing industries, then, woolen and worsted industries, then women 20 to 30 in voluntary organizations, then certain clerical and postal service grades and so on to include all categories not essential to the war effort.

In the ten months that America has been at war, American industry has probably travelled along a path similar to that which English industry has travelled. But English industry has had two years more of it than America has had and in those two years both labor and capital in England have been completely reorganized for war conditions.

The first trades in the gas industry into which women were inducted were, of course, the unskilled trades. They are working as assistants, commonly called "mates," to plumbers, painters, carpenters and to cement workers and bricklayers. This means heavy work, loading sand and cement and bricks into barrows and wheeling it to the spot required. Women are cleaning lamps, the engine rooms and they are washing locomotives. They chip rust off outside ironwork and pile timber in stacks. I have seen women in overhead cradles and on the top of tall ladders painting overhead gas mains. One little brown eyed woman was handling a 45 h.p. crane with which she picked up a ton or so of coal quite as easily as she had picked up a hod full in her own kitchen a few weeks before.

On a coke loading platform, open to all weathers, where the wind lashed the grit so that it stung my face, women were working in loading teams of three—two women to one man. The women held the sacks while the man operated an automatic filler and weighed 112 pounds of coke into each sack. The driver of the nearby truck then picked it up and stacked it on the waiting vehicle.

In another retort house, women were dismantling retort settings. In each setting of ten ovens, there were fifty tons of special silica blocks, which, through use, become fused and the whole setting has to be torn down and scrapped. Three women were assigned to tear down each setting and it would take them about two weeks to finish the job. They were swinging picks and sledge hammers and throwing their weight against crowbars tearing down solid walls; they were lifting chunks of the debris into barrows, wheeling the barrows to a platform and dumping the contents into a flat car below.

Many women are filling such jobs as bricklayers' and fitters' mates. Here women in a London retort house take their turn at night shift and carry on even during air raids.

Photo British Combine

Some of them were slight women, some of them were old. One woman had had twelve children and had five sons in the army. One woman had been a glass decorator, one a sugar packer, one a nail sorter, and one was a young housewife whose husband was reported missing at Singapore.

Not all women are on unskilled rough jobs. Many of them are doing ordinary factory work in the refineries such as making mothballs by machinery. Many are tending stores. One handsome ex-barmaid was shovelling oxide. Some are driving trucks and others doing maintenance work on the company railroad beds. Some are doing welding.

Many women are being trained for more skilled jobs. They are selected on the same basis that men were previously selected—by education, aptitude and intelligence. I visited one of the training centres where younger women were being taught the internal workings of water heaters, cooking stoves, gas fires etc. Lectures and demonstrations were followed by practical work. They took used equipment to pieces, cleaned it, replaced broken or worn parts and reassembled them. After a remarkably short time, these girls were ready to take on a complete job of re-conditioning gas equipment. This is a very important job in a country where there will be no more new equipment manufactured until after the war.

Left:—Two women workers are seen preparing oxide for re-use. Right:—Here three women are dismantling retort settings in preparation for rebuilding.

Photos British Combine

On "outside" work there has been even a greater replacement by women. There is the "lady gasman" who reads the meters. She has a slightly higher standard of education and puts in a period of apprenticeship, on full pay, before she tackles the job outright. She has to be a level headed young woman, willing to climb over the winter's supply of coal or stand on a table or do anything else necessary to read a meter in an inaccessible place. The "lady gas man" wears the company's uniform—in London a dark blue box coat with straight skirt and a cap with a shiny visor.

In many of the poorer districts, the old slot gas meter is still in use and the money in them must be collected periodically. Women are doing this job. It means carrying a heavy bag full of small coins for many a weary mile. At first the gas company's car must meet the woman collector more often than it does the man collector to relieve her of the weight. But soon she has learned the knack of slinging the bag over her shoulder and as she strides down the street in the regulation man's trousers, coat and cap, one would take her for a man. Gas companies in England are urging the consumers to use silver shillings (equivalent of twelve copper pennies) so the meters will not get full so quickly. Also it keeps the copper pennies in circulation and new ones do not have to be minted.

Other "outside" workers are "servicers". They go into training for several weeks on full pay and are taught in the workshop how to diagnose trouble and how to make simple repairs. In crowded city districts they make their calls on foot but in country districts they can claim priority on the nation's meagre supply of bicycles. But in either case they carry their kit of tools with them and they do a fine job at keeping the home fires burning. They wear the ordinary bib-overall under the company's one piece straight topcoat with patch pockets.

It must be mentioned to the credit of the gas companies that they have reorganized their plants in many ways to make the employment of women possible. In every plant, special washrooms and lavatories have been built and in many cases a company nurse added to the staff for their benefit. Even in undertaking employing only a very small proportion of women workers, such improved conditions have been made.

It is the avowed policy of the gas companies, according to an official of their federation, that men's wages are paid to women doing men's work. The principle of the "rate for the job" is part of their agreement with the Trade Unions and it is accepted by both the men workers and the companies as merely what is due the women. There are many instances of a "one to one" replacement and in those instances the woman receives the man's pay. In the heavy work where three woman are doing the work of two men, the women are said to be 66% man-efficient but their basic pay is never lower than 80% of the man's basic pay. In the lighter work the women are estimated to be 75% man-efficient. In the clerical, secretarial and accountancy departments where there has been almost complete replacement, the women have averaged 115% man-efficiency.

Several theories have been advanced to explain the success which has accompanied the employment of women in the gas industry in England. Many feel that great credit is due the foremen upon whose shoulders much of the weight of the change-over has fallen. Many an openly anti-woman foreman has been forced to change his attitude, while the foreman who gains the wholehearted support of the women workers has had no trouble in maintaining production.

Another reason, I believe, is that there is such a high proportion of gas workers' wives taking their men's places in the plants. "It's Jim's wife doing his job." The wife of the average English working man is not so fine a lady that she will not accept just as hard and just as dirty a job as her husband was doing. She knows that he has gone off to no picnic and she considers that they are "in it together" in a courageous way.

There were many times during the gruelling months of 1940-41 that the women were on night duty when Hitler made the gas works his target for the night. Bombs have shaken the retort houses, gas holders and gas mains have been set alight and the women have gone right on working —pale but steadfast and determined. Many of them have gone home to find their little houses a pile of rubble. Great areas near gas works have been laid in ruins and hundreds of George medals have been awarded gas employees for their bravery under attack.

Statistics show that these women are not giving their country so many babies these days but they are giving the world a fine example of everyday, routine devotion, courage and self-sacrifice.

This little token of your esteem the enemy received last night!

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Gas Cookery in the Douglas Aircraft Plants

By
Lucius S. Flint

GAS COOKERY is an integral part of the plane production program in the giant plants of the Douglas Aircraft Co. Gas is the essential fuel in the extensive Douglas cafeterias which mean the difference between well-nourished bodies and a lack of them among the company's thousands of employees.

This organization, one of the nation's largest producers of war-planes for Uncle Sam, makes certain that workers get properly balanced rations of nourishing food by serving them three hot meals a day in huge plant cafeterias. Results of that plan are reflected in many ways, including the following:

1. High production per man per hour.
2. A remarkably low number of sick days per man per year.
3. A very low industrial accident rate.
4. The holding of material spoilage to an unusually low level.

As a result of the aggressiveness of two employees, both former welders in the company's Santa Monica plant, Douglas began experimenting with employee feeding way back in 1937. It all happened this way. J. L. Stevenson and John Thompson, now Director and Assistant, respectively, of the company's vast food service department, noticed that many of the men seemed to wear out a little before noon and toward the end of the day.

The two men had an idea—they reasoned that workers simply weren't getting enough food to fuel their bodies for the energy-eating, precision work they were doing. Since Douglas has always encouraged employee initiative, Stevenson and Thompson decided to try an experiment. They pooled their resources—consisting of $10 — and bought several boxes of candy bars. Setting up shop in a bench drawer, they began peddling bars to other men in their own department.

They sold out the first day and reinvested their earnings in more candy. It was the same story the second day and the third and the fourth. Before long, the old bench drawer was simply too small to hold a day's supply.

The remarkable thing about it was that the more candy Stevenson and Thompson sold, the more work the department produced. The foreman reported to his superiors and word went on up to President Donald Douglas.

Douglas was interested, came down to see what went on. As a result of his visit, the two welders were authorized to buy a cart and peddle candy throughout the plant. But the venture didn't stop there. Soon, soft drinks and sandwiches were added—and then milk and ice cream.

When the business outgrew the cart, Stevenson and Thompson obtained permission to open a permanent canteen—the first of many. A little later, research was launched on the effects of hot food, research that resulted in opening of the first aircraft cafeteria in the nation. Today, Douglas has anywhere from one to a dozen cafeterias in each of its plants, serves three hot meals a day to a majority of its people. In addition, flash energy is made available for between-meal use by candy-bar and soft-drink dispensing machines which are scattered through every department of all the plants.

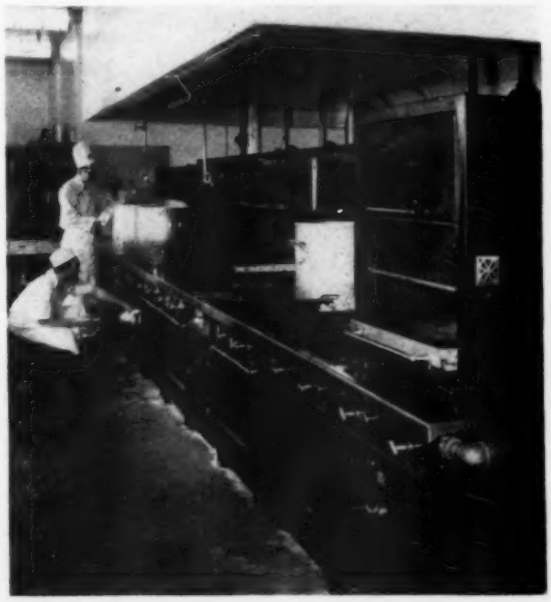
"We're convinced that food has a great deal to do with employee efficiency," says Donald Douglas. "The man who neglects a single meal is sacrificing some of the energy he needs for the job at hand.

"And neglect in this case doesn't necessarily imply a failure to eat. A meal that isn't digestible or is improperly balanced isn't much better than no meal at all. We encourage our people to eat three hot meals a day because of these factors: a hot meal is usually more digestible than a cold one; a hot meal is nearly always better balanced."

Feeding Handled By Welfare Division

Many war-production plants have shied away from employee feeding because of the headaches it often involves. If workers are to be given food values that will lead them to use company cafeterias, there's relatively little profit. Large equipment investments are involved. Personnel is definitely a problem. On top of that, it's a tough job to keep people satisfied with mass cookery when they eat in the same place every working day of the year.

Douglas has avoided all those difficulties and has greatly aided workers by turning over the feeding operation to its Employee Welfare Division. That department, like the feeding program itself, dates back to the original efforts of Stevenson and Thompson. Their first profits went into this fund. All profits still go into the fund. The only thing the com-



A battery of ranges at the Douglas, Long Beach plant.

pany asks is that the department do its share to keep employees healthy, happy and efficient by giving them a maximum amount of the best food at the lowest possible price.

That the job is being done is evident from these figures: in some plants, as many as 72 per cent of all the employees are eating three meals a day in the company cafeterias; in any of the plant cafeterias it's possible to get a complete meal for 35 cents—a meal that would cost 60 cents or more in a commercially operated restaurant.

The setup is simple. The Welfare Division operates the cafeterias just as a private contractor would do. But instead of the profits going into private coffers, they're returned for use in aiding employees when they need help. If a man is ill over a long period, the welfare division buys his groceries and pays his rent. If he gets into traffic trouble, an attorney is waiting to serve him. If he needs a notary, he gets this service without charge. These are just a few examples.

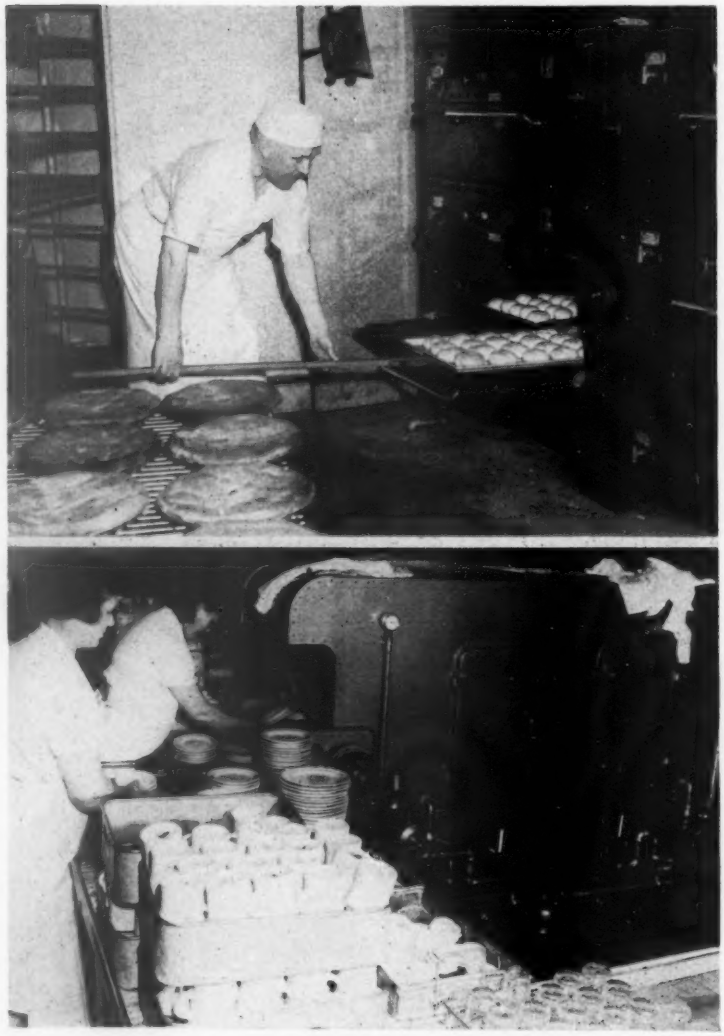
Because of the shortage of trained kitchen help, regular operating routine has been varied slightly in the Long Beach plant. Here, the feeding operation has been contracted to a private industrial cafeteria operator, the H. S. Anderson Co. But even here, the food service is supervised by the Welfare Division and quality and prices have been kept to standard.

Huge All-Gas Kitchens

Foundation of the cafeteria setup is, of course, a series of huge central kitchens, one in each plant. Although in some of the larger plants, serving is done not only in the main cafeteria but also in numerous branch cafeterias and even in small, stationary canteens, everything is prepared in the central kitchen. This arrangement eliminates unnecessary food waste and saves a great deal of labor.

Because of the necessity for giving employees the very best food at the lowest possible cost, the company has spared no expense in kitchen equipment. Few of the largest hotels in the nation can boast as modern or efficient a setup as you'll find in any of the major Douglas plants. Every possible labor saving device has been included. Equipment capacities have been planned so as to allow a substantial margin for growth in food demand and to eliminate the necessity for overloading equipment.

These kitchens are virtually 100 per cent gas operated. Everything that isn't motor driven is gas operated.



Upper: Fresh bakery goods from these big gas-fired ovens tempt the palates and nourish the bodies of Douglas workers.

Lower: Newest type dishwashing equipment is a feature of every cafeteria kitchen.

Size of the installations varies widely. For instance, the smallest range setup consists of three sections while the largest to date has 12; but they're all gas. The following list of major equipment in the Long Beach cafeteria is representative:

1. Ranges—Nine regular sections and 1 new-type broiler section, all Magic Chef by the American Stove Co. This equipment uses the new uniform hot-top feature.
2. Bake ovens—Four three-deck sections by Magic Chef, all equipped with the new controlled heat feature on bottom and top and having steam injectors and special pilot lights which stay on when the steam is turned in.
3. Cookers — Three Cleveland steam chef cookers of the three deck size.
4. Two Wearever steam jacketed kettles for which the steam is provided by gas fired boilers.
5. Proof box—gas heated by Magic Chef.
6. Donut fryer—Pitco.
7. Deep French fryers—two Magic Chef units incorporated in the battery of ranges.
8. Vegetable steamers — Magic Chef.
9. Steam tables—gas heated.
10. Dishwashers — Two specially made Champion outfits having a capacity of 18,000 pieces per hour on a two-speed conveyor. These are equipped with steam sterilizers and magnastat valves which turn off the rinse water automatically. Steam is again provided here by gas-fired furnaces.

Complete Bakeries Included

In order to make possible the serving of superior bread at a low price and to provide for the baking of hot

breads, pies and cakes, Douglas has included a complete bake shop in each of its cafeterias. In every major plant, thousands of rolls, muffins and pies are served daily. At Long Beach, for instance, the quantities run something like this: 200 dozen bran muffins a day, 750 dozen pies a day, 275 dozen donuts for breakfast alone.

Again for reasons of quality, the Douglas cafeterias use only fresh fruits and vegetables or fresh frozen ones. It's the same story with meat — carloads of nationally-known, branded hams and bacons are bought at a time. Fresh meat is purchased in carload lots and aged in the company's own coolers. They say the members of Uncle Sam's armed forces are the best fed men in the world but if that's the case, employees of Douglas Aircraft must certainly run a close second.

The preparation rates right along with the ingredient quality. Formulas were originally developed from small quantity recipes and chefs are absolutely required to adhere to those formulas. Vegetables are cooked quickly and with as little water as possible to preserve vitamin and mineral contents. Even the majority of meats are served rare with this same view in mind.

Menus are balanced according to scientific standards and are constantly rotated so that employees will never tire of the cafeteria food. The same entree is never served more than once in 18 days, usually not more than once in 22 days.

Many steps are taken to make the food appetizing in appearance. Walls of the cafeterias are decorated in pastel shades which helps emphasize food colors. Even the lighting was planned with that view in mind—red has been combined with the daylight fluorescent tubes.

On the serving counters, careful attention is paid to color contrast in the various dishes. For example when a white stew is served, there's a bright vegetable to go with it—something like beets.

Even the uniforms of waitresses are designed to help create a cheerful, constantly changing atmosphere which will stimulate appetites and keep employees from tiring of the food and surroundings. The uniforms are completely changed every four months—both in color and design.

"It's no small task to see that employees enjoy their food when they eat in the same place every working day of the year," explains Welfare Director Stevenson. "All of us know from personal experience that no matter how good the food, we're inclined to tire of eating in the same restaurants. It's human nature to want change. It's up to us to provide that change in the same restaurant."

Breakfast Served For All Shifts

Another interesting thing about the Douglas setup is the fact that breakfasts are served for all shifts. Research revealed that the men who work peculiar hours are inclined to rush off with nothing but coffee under their belts. And that doesn't lead to efficiency.

So, Douglas makes hot breakfasts available at all hours. The cooking and service problem involved here was solved by offering dishes which are suitable for any meal—breakfast, lunch or dinner. This includes items such as steaks and chops and egg dishes.

One of the most remarkable facts about the whole feeding program is that Douglas workers eat well-balanced meals of their own accord. When the first cafeterias were installed, it was thought that an educational program of some sort would

(Concluded on page 59)

Heat treatment — health treatment — are two vital factors in the country's all-out war effort. Heat treatment of metals makes America's war materials tough. Health treatment, serving the family nutritious food properly cooked, makes strong Americans. Both are essential for Victory. Both are responsibilities of your gas service.

Gas does the heating job on the industrial front — the cooking job on the home front with equal proficiency. This is the double duty job of gas service — a double duty with a single purpose, to help win the war.

THE OHIO FUEL Gas Company

DOING DOUBLE DUTY★★

Gas Serves the HOME Front and WAR Industries

One of a series of timely newspaper advertisements used by the Ohio Fuel Gas Company. The double duty of gas service on the industrial front and on the home front is effectively played up. Original size 3 columns, 10" high.

Industrial Metering

By
Allen D. MacLean
Vice President and Chief Engineer
Pittsburgh Equitable Meter Company

We have had many requests from gas companies, whose industrial load has risen rapidly during the past year, for data on industrial metering. The subject was covered so thoroughly by Allen D. MacLean in a paper read at the A. G. A. Distribution Conference, held in April, 1941, that we are re-printing it. Ed.

IN THE AVERAGE gas distributing company, particularly in recent years, the proportion of gas sold to industrial consumers becomes increasingly larger. The many benefits derived from using gas—the ideal fuel—are being appreciated more and more by all types of industries. The growth of "industrial gas departments" and the increased employment of specialized industrial engineers by the gas companies bears witness to this well deserved growth.

In many respects the sale of gas for industrial consumption varies greatly from sale to the ordinary domestic or even commercial user. In the first place, gas is under direct and continually active competition from other forms of energy such as oil, coal, electricity and the liquefied petroleum gases; hence its application must be the most efficient possible. By the same token, measurement of sales to an industrial consumer should be as accurate as possible. Then too, since manufacturing cost as compiled by the consumer includes the cost of gas, he will be more attentive to the meter and its accuracy. He may even time it for certain periods to check his hourly cost; he may install departmental meters of his own to check various operations. In other words, the average industrial consumer is very conscious of his measurement and he should be provided with accurate and satisfactory metering.

Another respect in which industrial metering differs from domestic is in the size and nature of the load to be measured. Obviously industrial loads will be much larger than domestic ones, but a fact which we sometimes fail to consider is that the average industrial load is more nearly constant than the domestic one. With many domestic consumers, the maximum flow rate may be only a small part of the total connected possible load; as contrasted to this many industrials will operate up to their connected load capacity for many hours at a time. This of course has a direct bearing on the selection and maintenance of the meter.

There are many other essential differences between domestic and industrial consumers such as meter location, pressure of measurement, period of maintenance, period of reading, which tend to put industrial meters in a class quite distinct from the domestic meter.

In some gas companies the problem of industrial meters is handed to the domestic meter shop with the hope that they can in some way spare a little effort from their job of repairing domestic meters to take care of selecting and maintaining industrial meters. In other situations, the industrial gas department takes on, in addition to the already arduous job of selling gas, the rather specialized task of supervising industrial measurement. The entire matter of industrial metering is of sufficient importance to the management to see that it is not bounced around between departments. Progressive management makes certain that this important source of revenue is well handled, and that industrial measurement is as accurate as can be provided.

In approaching the problem of industrial measurement, we must survey the types of measuring devices which are normally available. Three general types are used; the orifice meter, the rotary displacement meter, and the diaphragm type positive meter.

The Orifice Meter

The orifice meter is generally used on large loads where there exists a pressure in the mains sufficiently high so that the pressure loss, incidental to orifice meter measurement, can be permitted. Power plants, steel mills, and industrial plants make up consumers of this type. We do not intend to go into the theory and practice of orifice meter measurement here, except to note the condition under which measurement can be made. As pointed out above, there must be a sufficient pressure to be able to stand the pressure loss required in orifice meter measurement. Then, too, the variation between maximum flow rate and minimum flow rate with a simple orifice meter cannot be greater than four to one. If there is any very great sale of gas at a flow rate below one fourth of the maximum, considerable revenue may be lost. By using a dual meter, which is in effect two recording differential gauges which are connected across the same measuring orifice, one arranged to measure the lower differential pressures only, the range of maximum to minimum can be extended to a seven or eight to one ratio.

Another method of extending measurement range of the orifice meter is to provide several meter runs each with its own orifice. As the load varies from a minimum, which can be measured by a single run with its meter, to a larger flow rate, the valves of the next run are opened and the load then metered by the two runs, and, of course, added together. Three, four or more runs and meters can be used this way. The opening and closing of the additional runs can be either manual or automatic. If the changes in flow rate can be anticipated, manual shifting of runs with load variation is possible; however, usually the nature of industrial load changes is such that some sort of automatic means for adding and subtracting is required.

Customer Contact Essential

As stated before, a good customer contact as to measurement is essential to successful industrial metering. To many industrial consumers, the orifice meter offers an important feature in that the chart, on which computation of measurement is based, can be used as a demand meter. Just when the heaviest hour occurred and the value of flow during any hour can be readily determined and oftentimes is of considerable value to the customer.

In rendering a bill based on the orifice meter, the charts which record differential and static pressure are removed from the meter gauge every 24 hours or every week, depending

on the clock selected for the job. It would be well to occasionally go over the calculation of these charts with the consumer to be sure that he is well informed of the measurement.

The rotary displacement meter has found some acceptance in industrial metering, particularly for larger flow rates where there is not sufficient pressure to employ the orifice meter. This type of meter provides accurate measurement when applied properly. It has a certain limitation at low flows, in that clearances for operation must be provided between the rotors and side walls and between the rotors themselves. It is possible to use a tandem construction, automatically operated to permit the low flows to be measured by a diaphragm type positive meter. At higher flows the diaphragm meter is automatically bypassed.

The final group of meters to be discussed is the positive meter of the diaphragm type. This instrument employs the same principle of measurement as is used in the domestic meter. However, there are some very essential differences in design, application, testing and maintenance.

High and Low Pressure Groups

Industrial measurement with the diaphragm type meter is divided into two classifications, the high pressure group and the low pressure group. Wherever it is possible to serve an industrial consumer directly from a high pressure or medium pressure line, it is customary to do so. There are very many economies effected by serving gas in this manner. In the first place, since the gas is denser at high pressures, more gas can be sold to the consumer through a smaller meter installation. Then, too, if the industrial consumer receives the gas at high pressure, he can transmit it to any part of his plant in sufficient quantities and at a sufficient pressure to obtain the kind of combustion he wants. Often times the use of boosters and other devices to raise the normal low distribution pressures to a satisfactory combustion pressure for the industrial burner will cause a very heavy draw on the low pressure system and, of course, is expensive. When gas is served at high pressure, this type of pressure boosting is not necessary.

The first obvious requirement of a meter to measure gas at high pressure is that it will withstand the gas pressure safely and for this reason all industrial meters for this type of service are of iron or steel. The principle of operation of these meters is the same as the small two diaphragm slide valve domestic meter. It might be well to study the load on a meter in measuring gas at various flow rates and of various densities.

It has been the custom for a number of years to rate domestic meters in "Lights." For instance, a 5 Light meter on the present standards is said to pass 150 cubic feet of 0.6 gravity gas per hour with a loss in pressure across the meter not to exceed 0.5″ of water. This rating we have inherited from the old days when the major load on a meter was gas lights. Gas lights were rather sensitive to pressure variations and since the operator did not wish to absorb too much pressure in his meter, the meter was rated as the number of lights it would carry without an excessive pressure loss. The pressure loss across the meter in operation is caused by two factors: first, the actual flow rate; and second, the density of the gas. In general the flow through a meter follows the formula of the fow of gas through any orifice which can be written as follows:

$$Q = K\sqrt{\frac{h}{G}}$$

Where:

Q = Rate of flow in cubic feet per hour displacement, that is, dial speed.

K = A constant depending upon the meter or whatever the resistance.

h = The pressure loss, usually expressed in inches of water.

G = The density of the gas compared to air at atmospheric pressure as being 1.

If we examine this formula we observe that if we increase the flow rate "Q" while we hold the density of the gas "G" constant, to balance the equation we must increase the pressure loss "h." If we double the flow rate "Q" we must increase "h" by four times since it is under the square root sign, or to put it another way, the pressure loss varies as the square of the flow rate through the meter.

Let us assume, however, we maintain the flow rate the same but vary the density of the gas, that is, vary the value of "G." If we maintain "Q" constant and double the value of "G," to satisfy the equation we must double the value of "h." In other words, for any given dial speed of the meter the pressure loss across the meter varies directly as the density. For a given gas the density will vary directly as the absolute pressure and hence we have our pressure loss across the meter varying directly as the absolute pressure for any gas. This means if we operate an industrial meter at a dial speed of 5,000 cubic feet per hour on a gas of 0.6 gravity, we will obtain a pressure loss of, let us say, 1″ of water column across the meter. By compressing this gas to approximately 15 pounds, we will increase this density from 0.6 to 1.2 and we will cause a pressure loss of 2″ of water. If we should increase the measuring pressure to approximately 45 pounds, we would increase our density by four times and for the same dial rate of the meter we would increase our pressure loss from 1″ to 4″. Please note that in this case we use the word "dial rate" rather than cubic feet. Although cubic feet of displacement remains the same, the cubic feet of gas reduced to a base pressure, of course, will be much greater in these last two cases. It is on this point, that is, high pressure loss across a meter as the density of the gas is increased by higher pressures, that the main difference between the average tin meter and the iron or steel meter is found. The average tin meter is designed to withstand only maximum pressure losses of ½″ of water. The average iron or steel meter is designed to operate and maintain accurate displacement at pressure losses considerably above ½″ of water, often times ranging to 4″ or 5″ of water. This ability to withstand higher pressure losses is gained by using much more rugged parts throughout. All bearings, flag rods, flag arms, flag links, tangent parts and valve parts are made very much more rugged than they are in the small domestic meters and even in the large tin meters. Since the strains on the parts may be considerably greater, all bearings are carefully designed and diaphragms in their construction are made to withstand these higher pressure differences.

Rating Meters for Capacity

To actually take advantage of the design of these meters and be able to rate them for capacity under various conditions of flow rate and gas density, we have to study them as a mechanism. Any mechanism operated at high speed and high load will wear quickly. If we reduce the speed to maintain a high load or if we reduce the load and permit a high speed, we increase the life of the mechanism. The correlation of speed and load should be known in determining just how to rate any mechanism, such as a meter. In order to accomplish this fact for an industrial meter measuring gas at high pres-

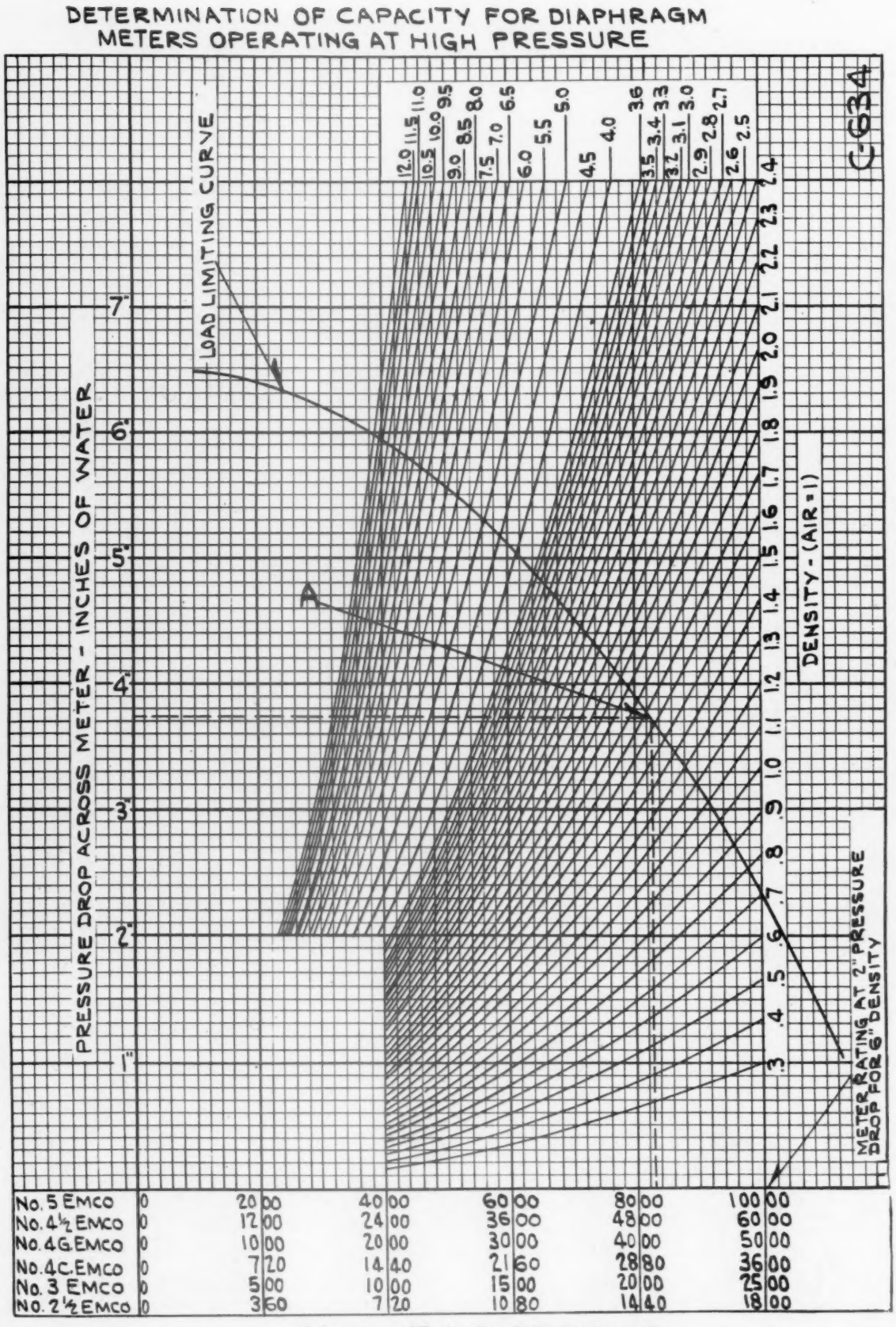
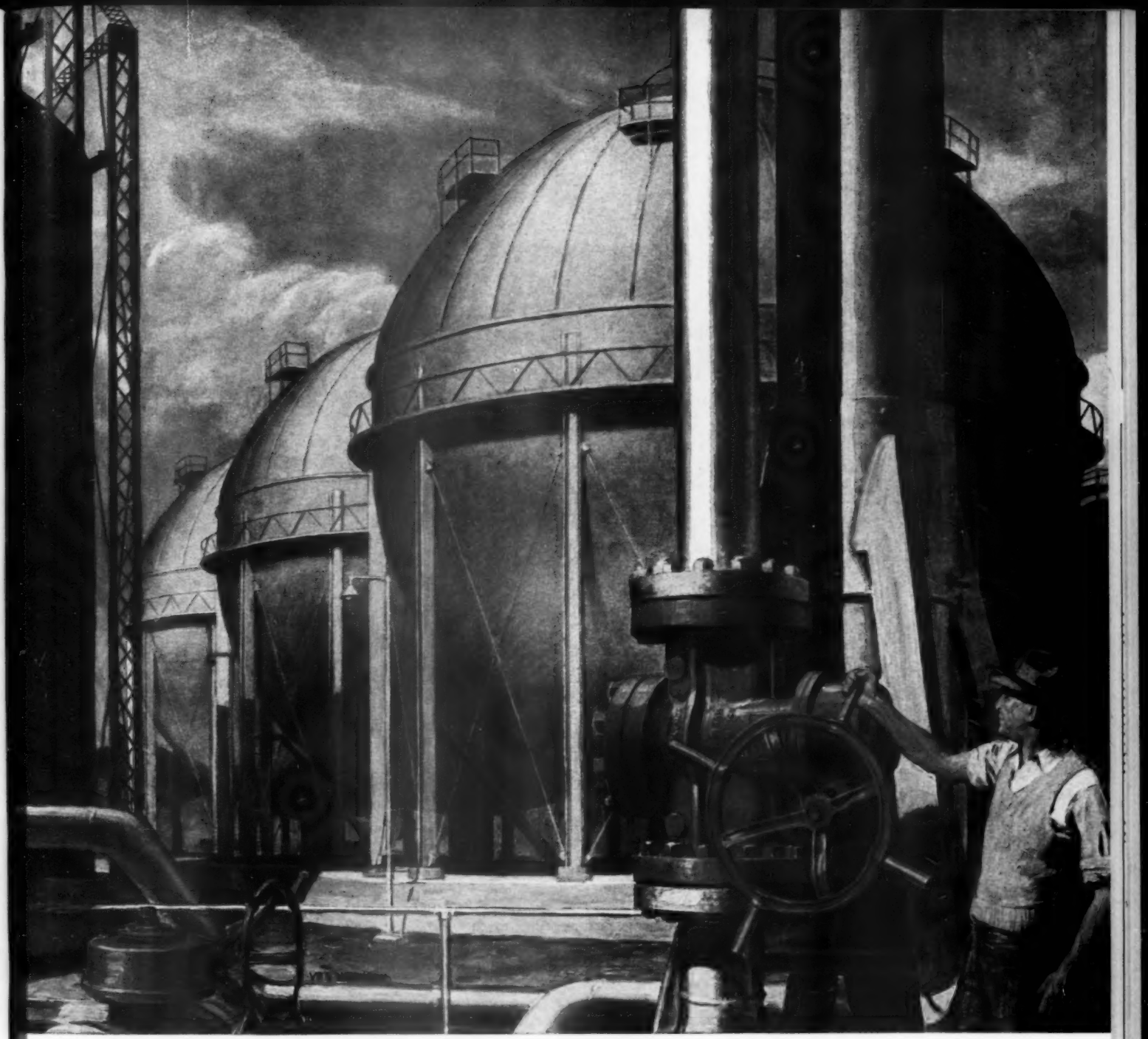

DETERMINATION OF CAPACITY FOR DIAPHRAGM METERS OPERATING AT HIGH PRESSURE
C-634
LOAD LIMITING CURVE
A
PRESSURE DROP ACROSS METER - INCHES OF WATER
DENSITY - (AIR = 1)
METER RATING AT 2" PRESSURE DROP FOR 6" DENSITY
No. 5 EMCO 0 2000 4000 6000 8000 10000
No. 4½ EMCO 0 1200 2400 3600 4800 6000
No. 4G EMCO 0 1000 2000 3000 4000 5000
No. 4C EMCO 0 720 1440 2160 2880 3600
No. 3 EMCO 0 500 1000 1500 2000 2500
No. 2½ EMCO 0 360 720 1080 1440 1800
CAPACITY - CU. FT. PER HR.

FIGURE 1

CURVE FOR DETERMINING THE CAPACITY OF HIGH PRESSURE METERS



VALVING GAS TO OCCUPY *1/600th* NORMAL SPACE

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First installation of a commercial method for liquefying natural gas so it occupies 1/600th its normal space is in operation. The plant was constructed by the East Ohio Gas Company at Cleveland, Ohio. Thermostyle gas containers hold the liquefied gas under pressure. Each sphere stores 84,000 cubic feet of liquefied natural gas which will expand to 50,000,000 cubic feet when released. Temperatures to minus 250° F. are involved. Every trace of free water, carbon dioxide, nitrogen and oxygen must be scrubbed from the gas. To withstand the high pressures and extreme sub-zero temperatures, the valves *had* to be right. Nordstrom Valves control the majority of lines in this revolutionary installation, assuring safety. *They keep upkeep down.*

EMCO-NORDSTROM TYPE

With Nordstroms, you get many times more valve life

True valve economy is measured by performance and length of life. You can take a Nordstrom Valve and apply it to almost any service on your flow lines with assurance of permanently satisfactory performance, because of these principal features:—

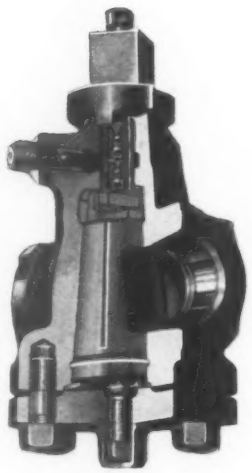
1. Easiest opening and closing operation.

2. Quickest action; a quarter turn opens or closes the valve.

3. No frictional packing gland; a simple metal sealing diaphragm, tightly held by a resilient thrust member, prevents leakage above the plug. (In the Hypreseal Type a long threaded seal with annular plastic packing accomplishes the same effective result.)

4. The plug is precision ground and then lapped into protected seat. (For high temperature services, the plug is hot-lapped at operating temperature.)

STANDARD TYPE



HYPRESEAL TYPE

5. "Sealdport" lubrication provides a pressure seal of lubricant around each port, when valve is open or closed.

6. The plug remains seated on its pressure film of lubricant. This pressure can be increased by a few turns of the lubricant screw, to free the tapered plug if or when it becomes hard to turn.

7. There are no exposed grooves or channels within the valve where line contents can lodge to prevent closing.

8. The inherent design of all Nordstrom Valves offers greatest resistance to corrosion and erosion.

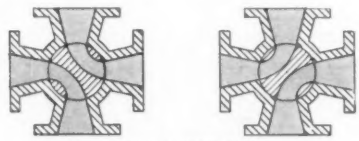
9. All Nordstrom Valves are tested to twice their working pressures.

10. Different types of lubricants are available, to meet each service need, from sub-zero to extremely high temperatures.

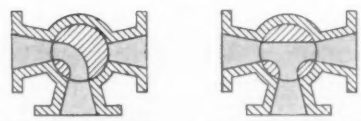
Nordstrom Valves have a reputation for outwearing, outlasting, outperforming ordinary valves. Keep upkeep down with Nordstroms. *You'll get real economy.*

NORDSTROM MULTIPORT VALVES

Various modifications in Nordstrom Valves include the Multiport design offered in Standard and Hypreseal Types. One 3-way or 4-way Multiport may be used in place of 2, 3, or 4 straightway valves, and in most cases will also eliminate other fittings such as tees and elbows. Sizes range from ½" to 16". Various port and stop arrangements are provided to permit required operating connections.

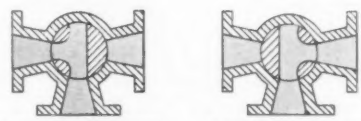


4-WAY, 4-PORT VALVE
90° TURN



3-WAY, 2-PORT VALVE
90° TURN

3-WAY, 3-PORT VALVE
90° TURN



3-WAY, 3-PORT VALVE
180° TURN

3-WAY, 3-PORT VALVE
270° TURN

ABOVE VIEWS SHOW VARIOUS MULTIPORT ARRANGEMENTS

THERE ARE MORE THAN 2000 SIZES AND MODIFICATIONS OF NORDSTROM VALVES IN A WIDE RANGE OF PRICES SO THAT YOU MAY SELECT GENUINE NORDSTROMS WITHIN YOUR BUDGET OR TO MEET ANY SERVICE. DESCRIPTIVE BULLETINS WILL BE FURNISHED UPON REQUEST.

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Sealdport Lubrication

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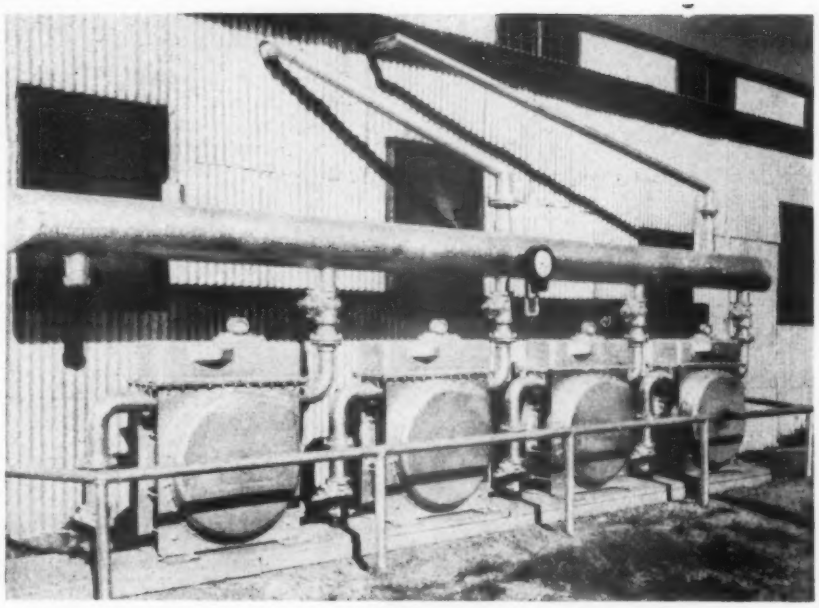


FIGURE II

sure, we must provide some means to correlate load and speed. The speed in a meter we express as dial speed or actual cubic feet of displacement at the pressure of measurement. The load on a meter we must eventually express as pressure loss across it, but above we discovered that the pressure loss depends upon two factors, first the dial speed and, second, the actual density of the gas. Since these factors are interwoven, the best way to determine the capacity of the meter is to plot a curve such as shown in Fig. I. On this curve abscissa represent the actual dial speed of the meter and by ordinates at the left we represent the pressure loss across the meter expressed in inches of water head. For any given meter, from our experimental work, we know that at a given dial speed with an 0.6 gravity gas will cause a pressure loss of a given amount. From this fact we can determine the pressure loss at any dial speed for that particular gas from the formula given above. In this way we are able to plot a series of curves starting at the lower left hand corner and moving upward to the right. These curves give for each line the pressure loss through the meter for a gas with a density corresponding to that line at the various rates of flow as given by the abscissa. Thus following out the line for any given density of gas we can at any given flow rate determine the pressure loss existing under those conditions.

Considerable study, experimental work and observation will tell us about what to expect in life from a meter as the pressure loss and speed varies. This experience is formulated in the curve which we call the load limiting curve, starting at the upper left hand corner and going down to the lower right hand corner and crossing the density lines. It will be noticed from this curve if we examine the point where it crosses the 0.6 gravity line, this corresponds with 2" of pressure loss. This is due to the fact that all meters of this type are given a rating on 0.6 gravity gas at 2" of pressure loss. In using this curve it is only necessary to know the density of the gas being measured and by following this density line to the point where it intercepts the load limiting line and then by dropping straight down to the abscissa scale, the maximum permissible dial rate can be obtained. To determine the density it is only necessary to multiply the absolute pressure of measurement times the specific gravity of the gas and divide by the local atmospheric pressure expressed in absolute units.

In effect, this curve merely tells us that if we measure gas at higher pressures we must limit the maximum dial speed to which the meter can be operated. If we use gas at lower pressures, let us say, normal distribution pressures, we can use a meter up to the maximum dial speed for which it is actually rated. Please note we have used the term "dial speed" here to correspond to the actual cubic feet displacement of the meter independent of pressure. It is obvious when the gas at metered pressure is reduced to base conditions of pressure, it will represent a great many more cubic feet numerically than the dial speed does. Thus, in using diaphragm meters at higher than normal distribution pressures they may be used at pressure losses higher than 2" of water providing the dial speed is reduced accordingly. Just how far to go in this direction will depend somewhat upon experience. The curve shown in Fig. I represents the experience of several years in using meters up to their maximum ability. The main point to note is that in meters designed for this type of service, accuracy is maintained by building all parts of extreme ruggedness. Meters of this type operating at, let us say, a pressure loss of 4" of water when this

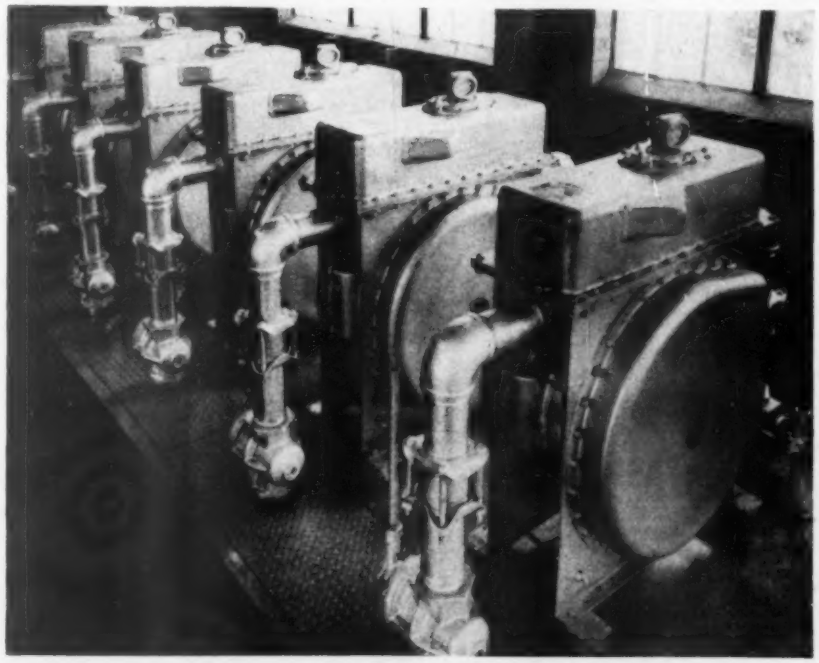


FIGURE III

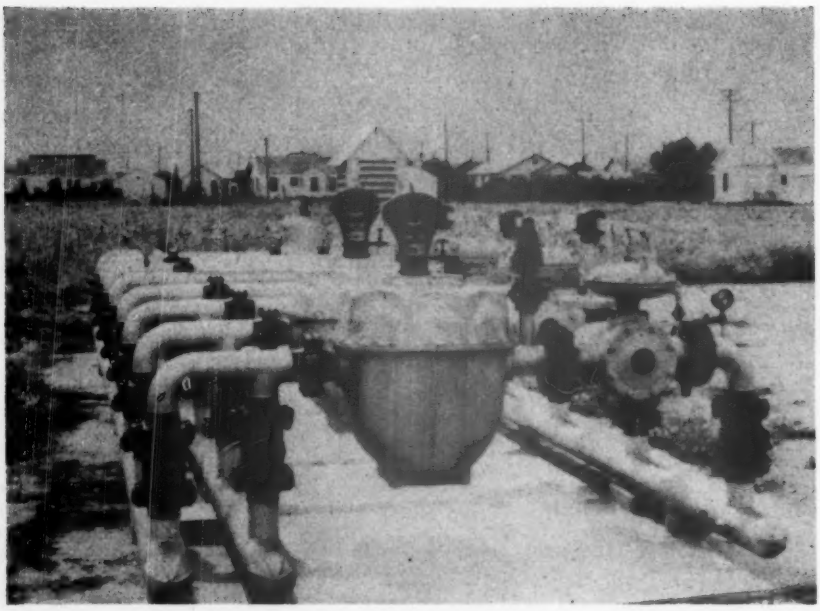


FIGURE IV

pressure loss is caused by density increase, will give the same degree of accuracy as domestic meters operating on pressure losses of less than ½" of water.

Industrial Meter Settings

Figs. II and III present typical industrial meter settings. Fig. II is an outdoor setting, using steel meters and measuring at low pressure. Fig. III is an indoor low pressure installation. Fig. IV is an outdoor installation using iron meters, and, since it is measuring at high pressure, employs an automatic device for reducing the metered volume to the equivalent volume at base pressure.

One fact which must be remembered in high pressure measurement is that the meter measures only displacement and that some means must be provided to permit a billing of gas at the base pressure. Gauges making necessary pressure and volume records on charts which can be computed is a method most commonly used. Automatic registers which automatically correct the volume to equivalent cubic feet of gas at base pressure were brought out a few years ago and have been improved steadily so that they offer a satisfactory and torouble-free method of arriving at the correct billing when gas is metered at high pressure.

Proving of Industrial Meters

In the field of industrial metering there is one subject on which there appears to be a great diversity of opinions and this is the proving of industrial meters. This one point should be well considered by every gas company management. Period of proving, tvne of proving equipment, expected accuracy, flows at which to prove and many other details should be determined and, if good industrial measurement is to be obtained, a rigid policy adopted and pursued.

In many locations the domestic meters are removed and returned to the meter shop for proving at stated periods. These periods are prescribed by statute, or by company practise. Industrial meters, not usually coming under regulatory bodies, are too often left to chance as to when they shall be proved. A survey indicates inspection periods ranging from once a month to an indefinitely long period. Actual periods of proving, i.e. checking the meter for accuracy also is extremely variable. Meter proving should be standardized in every company and should be based upon size and type of industrial meters. For this purpose a record by meter number of the meter's history should be kept. Our survey shows one company with a proving period as low as 2 months, and another with a proving period as high as 7 years. The results of a questionnaire on this subject are shown in Fig. V.

This matter of proving period for industrial meters is a controversial one. Two different schools of thought emerge as soon as the subject is broached. One contends that the basis for the proving period should be the number of cubic feet passed by the meter, (i.e. a mileage basis) while another, taking the cue from accepted domestic meter practise, tries to arrive at some fixed "time period" on which to base proving. One would be fool-hardy to judge between these two views; we might point out, however, that where "chemistry" is the deciding factor the time basis is preferred. For instance, in certain manufactured gas properties, condensates or gums may be the chief cause of meter inaccuracy, and the magnitude of the load might be relatively low. Obviously, a "time period" of inspection and proving will be the best remedy against inaccurate measurement in these cases. In places where natural gas is distributed, deterioration from chemical causes is usually quite slow. However, loads are often heavy and mechanical wear will usually be found to cause the inaccuracies. In these cases a logical period should be based on the "mileage" plan.

A careful analysis of meters removed from service for repairs will furnish a basis for determining the

(Continued on page 60)

	LOCATION	No. of INDUSTRIAL METERS	TYPES of INDUSTRIAL METERS: ORIFICE METER	ROTARY IMPELLER METER	LARGE TIN METER	IRON OR STEEL METER	FREQUENCY OF TESTING	TEST AT: METER SHOP	METER LOCATION	METHOD of TESTING: BELL PROVER	LOW PRESS. FLOW PROVER	CRITICAL FLOW PROVER	TEST METER	% MAX. FLOW of TEST AT MAX. FLOW RATE of METER	MINIMUM FLOW	REMARKS
	EAST	4166	0	0	4038	128	6 YEARS ANNUAL INSPECTION	✓		✓				YES	20% MAX.	
	SOUTH	1165	35	0	0	1165	1 TEST IN 2 YEARS TO 6 TEST PER YEAR ALSO AT 10,000,000 C. F.	✓	✓		✓	✓		YES	10-20%	
	SOUTH-WEST	1300	100	0	0	1200	6 MONTHS TO 3 YEARS	✓	✓	✓		✓		YES	20%	
	MID-WEST	165	1	0	0	165	2-3 YEARS 15,000,000-30,000,000 C. F.	✓		✓				YES	100 CF/HOUR	
	SOUTH	430	5	0	40	390	1 AND 2 YEARS	✓		✓				NO	7% APPROX.	
	MID-WEST	520	120	0	0	400	6 MONTHS TO 4 YEARS	✓	✓		✓	✓		YES	5%	
	EAST	6700	0	0	6600	100	BASED ON DIAPHRAGM AGE	✓		✓				YES	15%	
	SOUTH	123	5	0	0	118	QUARTERLY TO ANNUALLY		✓		✓	✓		80%	20%	
	MID-WEST	205	0	21	49	135	1 YEAR	✓		✓		✓		NO	5%	

FIGURE V

Coals and Cokes to Meet Every Need of The Gas and Coke Industry

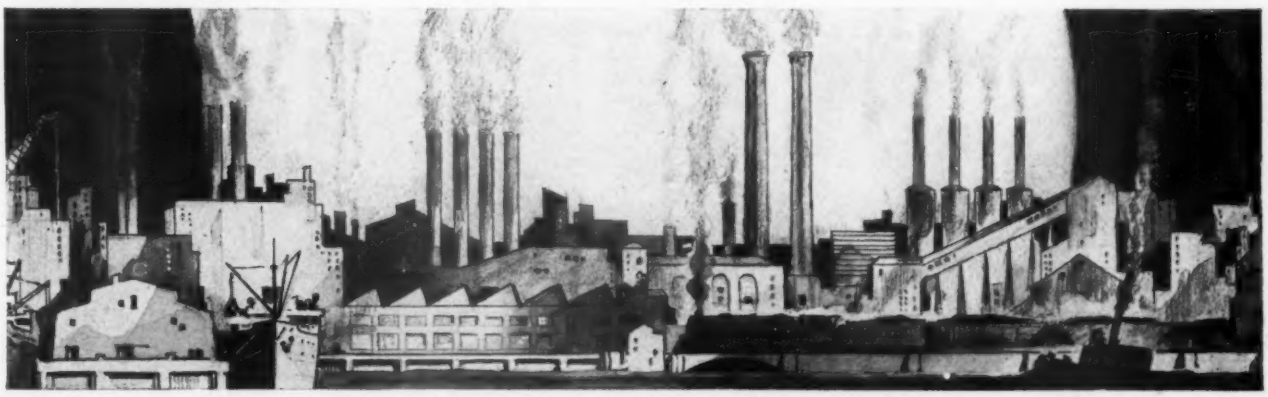
RODA · Admiralty Coal · STONEGA · Old Kentucky · GENCO · COKE · CRITERION COAL · PREMIX STOKER · CROZER · DENDRON

General Coal Company

123 SOUTH BROAD STREET . . . . . PHILADELPHIA, PA.

Branches

Bluefield, W. Va. · Buffalo · Charlotte, N. C. · Detroit · Norfolk
Boston · Charleston · Cincinnati · New York · Pittsburgh



Hot-Bending

...A VITAL FACTOR IN NATURAL GAS TRANSPORTATION

HOT-BENDING a 24-inch pipe weighing 80 pounds per foot—as shown above—requires the application of intense heat. Yet it is all in the day's work of laying pipe lines over mountains, along plains, and through rivers — wherever natural gas must be transmitted and distributed.

Unfailing continuity of gas transportation service requires that, whatever may be the character of the terrain, a pipe line must rest securely on the bottom of the ditch in which it is laid. To accomplish this, usually two or more 40-foot lengths of pipe are welded together before the desired bend is obtained. For such large construction, heavy field equipment is necessary.

This job of hot-bending is typical of the numerous exacting tasks which Columbia System performs in times of peace as well as during the present national emergency.

COLUMBIA GAS & ELECTRIC CORPORATION

COLUMBIA SYSTEM

Gas Company Accident Prevention Programs

IN THESE DAYS of dwindling manpower, the cutting down of lost working days due to accidents, is becoming a matter of concern to many gas companies. More and more, safety programs have been inaugurated, covering every activity of the company.

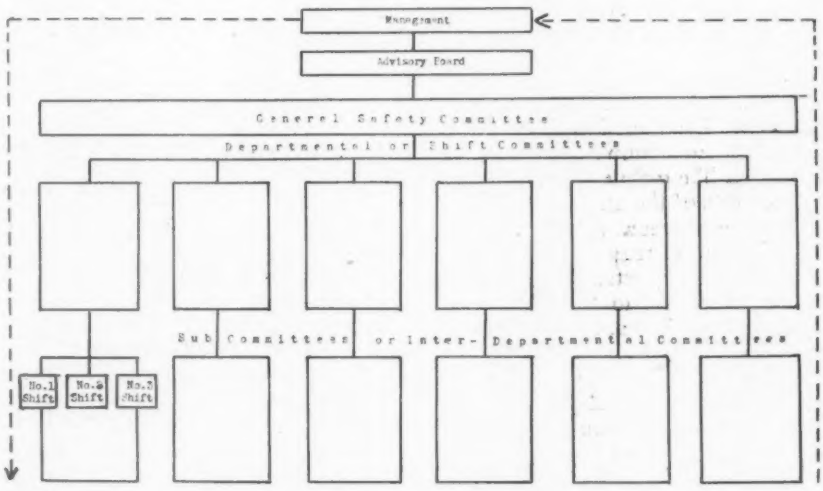
The JOURNAL is glad to present to the gas industry several of the safety plans in effect in the hope that the information will help other companies in their safety programs.

Safety Organization of Boston Consolidated Gas Company

By C. L. O'REILLY
Safety Engineer

The executive is the real Safety Engineer. The responsibility of Safety work, the extent to which it is established, the methods used in its establishment, rest with him. He has both a legal and moral obligation to see that the work is established and properly executed. Safety should be considered an operating problem deserving the same attention and close scrutiny from supervisory personnel which they accord any other production problem. The work requires not only the endorsement of management but its active assistance as well. No movement makes progress under indifferent generalship and no Safety campaign was ever made a success under a half-hearted leader. If the desire for Safety expressed by the employer to his employees is not genuine, sincere and high minded, no one will be fooled for long, EXCEPT THE EMPLOYER HIMSELF. Employees will not be fooled by a pretense on the part of the boss that he is interested in Safety unless he shows by example and precept that he is in earnest. Foremen should be made to fully realize that they will be held strictly responsible for preventable accidents involving workers under their supervision, and should be impressed with the fact that the success of the Safety effort depends to a great extent on their leadership and good example.

Now assuming that the first requirement is fulfilled, what is the next step? For success in any movement, organization is essential. The adjoining chart shows a set-up which has been found to produce very satisfactory results. This is nothing more than a straight line organization which permits any thought or idea to be passed from management down to the last man and vice versa any thought or idea from the last branch of labor back up to management if necessary. If the plant is large enough it should employ a Safety Engineer as well, but his position is not shown on the chart. If it were shown, his contacts would reach each and every block or bracket. An attempt will be made to explain the organization step by step but one can readily understand that there are many factors which cannot be dealt with in an article short of book size.



The block at the top of the chart entitled "Management" refers to someone at the top of the organization, such as Manager or Vice President, who has the right to pass upon any subject pertaining to the work, such as change of equipment, expenditures for equipment, company policy, etc.

Next is the Advisory Board which should consist of three or more members of the management or the next step down, such as Superintendent, Department Heads, etc. They should meet once each month on definite dates and on special occasions if necessary. They should pass on any question that has been brought up at lower meetings and which could not be disposed of, such as expenditures for some change, company policy, etc. Of course, some of these questions will have to be taken up with management. The idea in the entire set-up being that all matters be disposed of in the lowest bracket possible. For instance, in the department meetings all questions should be disposed of that can be handled in the regular routine of business and nothing passed on to higher committees except those that are necessary. They should also watch the progress of the work through a check-up of the minutes of the lower committees—the monthly accident reports, etc., and guide the work where it is needed. The secretary of this committee can save much time by having the necessary material and problems ready for discussion.

The next bracket is the general plant committee which does the bulk of the work. This committee usually consists of department heads and chairmen of department committees. Most of the problems are cleared through this committee and inasmuch as its members usually consist of men from the Advisory Committee and departmental committees as well it is readily seen that most problems could be answered from both the management and employee standpoint at this

meeting. They should meet at least once each month. All questions that have not been disposed of in the lower meetings are brought up for discussion and passed upon. They should be disposed of either directly through an order to a department head by the Chairman or given to the Advisory Board for consideration.

The next bracket consists of departmental meetings such as machine shop, boiler shop or any other department. They usually take in all members of the department and the department head usually acts as chairman. If the department has shift duty or is too large to be handled properly at one meeting then the lower brackets can be used. For instance, the bracket on the left might be the machine shop but the nature of the work might call for 24 hour operation or three shifts. It will be readily seen that one meeting per month will not cover the three shifts. Therefore, a meeting for each shift will be necessary. Each department should have a meeting at least once each month. Gangs or outside groups that regularly work away from plant are expected to hold regular meetings as well.

Committee Chairmen

An important factor in each committee is to have the right man for chairman. He should be the type of man that can conduct a meeting in a business-like manner—bringing out the thoughts of the different members for proper discussion, not allowing the meeting to drag or get monotonous, any suggestion brought up should be treated in the right manner even though it may seem to have no practical value. The meetings should not last much longer than one hour at the most and if properly conducted the business can often be disposed of in much less time.

The meetings should be set for a definite time and all members should be present on time to eliminate interruptions. A secretary should record the names of those present, late or absent, and minutes of the meeting should be recorded as well. If all members do not have minutes of the previous meeting the minutes should be read or at least the important items checked to see that they have been properly attended to. Under new business any accidents that have occurred in the department since the last meeting can be discussed as well as others that have occurred elsewhere that might apply to the particular type of work. Assuming that the accident has been properly investigated, the ways and means for prevention of similar accidents should be discussed and any new suggestions added. Any suggestion from management or higher committee should be given in detail and included in minutes. Suggestions should come from the employees for the elimination of hazards or anything that will improve conditions. These suggestions, of course, are to be given proper consideration (even though they may sound absurd or of no practical value) and recognition given to employee making suggestion. Any question that cannot be disposed of should be sent to the next higher committee to be acted upon, except in cases where it is held over for further discussion. Minutes should be forwarded to Safety Department or someone appointed to act as a clearing house to see that information is sent to departments or other places where it will be of some value. At first it may be difficult to get the proper response at these meetings but if the chairman is sincere in wanting to do the work and is the right type there will soon be plenty of material and spirit to make the meetings interesting and beneficial. Subject matter can be obtained through Safety Department or from the National Safety Council.

We do not approve of rallies or large group meetings to stimulate interest in Safety. Safety is a matter of education and should be carried out in a steady businesslike way rather than using the emotional appeal. There is no question that the emotional appeal has produced a great amount of good, but the psychology of the emotional appeal is, unfortunately, not as secure as other methods of teaching. It is a phychological fact that the emotions for a given stimulus do not remain at the same heat but rather cool off as the same stimulus is repeated.

In order to make the departmental meetings interesting and worthwhile it is quite all right to have a speaker, but in most cases this should be a man from the department. In some cases the speaker at one meeting chooses the speaker for the next meeting from the group and he in turn chooses another, etc. In some cases too someone from another department may be invited to speak, but it should be remembered that Safety is a departmental function just the same as any other branch of business and should not be made a side issue or be looked upon as some form of entertainment.

A word here about the Safety Engineer. There is no question regarding the advisability of having a Safety Engineer where the plant is large enough to afford one. He can be a very valuable man to any organization. Safety is not a one man or one department job. It must be handled through the regular operating channels as a regular operating duty or the desired results will never be attained. Plant executives and Safety Engineers must differentiate between advisory and executive functions. The Safety Department is primarily an initiatory and advisory body and if allowed to assume functional duties which appertain properly to the operating force the permanent establishment of Safety is actually delayed. If permitted to do so, it is only natural that foremen and operatives, instead of applying Safety to their own duties and gaining individual Safety responsibility thereby, come to rely more and more on the work of the Safety Department. The Safety Engineer, on his part, instead of devoting his time to what he is best fitted to do, is constantly at work on matters that are essentially a part of the accident prevention duties of superintendents and foremen. This, as stated before, is altogether wrong and leads farther and farther away from the establishment of individual Safety responsibility. The committee too sometimes spends its time on items that should be attended to by foremen or departmental heads.

The committee must survey, suggest, develop, correlate and stimulate the entire operating force into execution, but should never itself attempt to execute work that is essentially an operating function. If it does so it frustrates its own efforts to make Safety a part of every employee's duties.

Other Factors

There are many other factors that enter the work, most of which depend on how far the work has progressed, but a few will be mentioned which could be used at any stage.

(1) Membership in National Safety Council. Through this membership valuable information will be obtained which will be helpful to any company, large or small.

(2) Good housekeeping. This is quite essential to safe and efficient operation and applies to all type of work, no matter whether it be in the yard, shop or office. Foremen should see that employees are properly instructed not only to keep their jobs clear of excess material, but also to clean up after the work is done. No excess material, waste or otherwise, should be permitted during the work and the job is not complete until such material is properly disposed of.

(3) Instruction in a regular first aid course by a registered Red Cross instructor—for general foremen and

foremen and as far down through the organization as conditions will permit. This course can be arranged by contacting any local Red Cross unit and is very worth while.

(4) Investigation by a committee of three, of all major accidents and any case that could have resulted in a major accident. This investigation is for the sole purpose of finding out why and how the accident occurred and what steps can be taken to avoid a similar accident in the future. This information is passed on to all departments where it would be of any value. The investigation usually covers the following points: History of injured person, such as name, address, age, occupation, length of service, etc. Nature of injury, description of accident, statement of injured party and witnesses, finding of committee, responsibility, recommendation for prevention of similar accidents.

If these investigations are made in the proper manner and the information passed on through the proper channels they will be found to be very helpful in the work. Not only will they produce valuable information which is not usually obtained in the ordinary accident report, but they will also impress the employees with the seriousness of an accident and the assurance that management is in earnest. The employees should be assured that the investigations are not for the purpose of placing the blame on any one individual but to get information which will help avoid future accidents.

One might think with all the committee work that considerable time is spent away from the regular work but this is not the case. The meetings take place only once each month, lasting an hour or less and consuming only a fraction of one per cent of the total time worked. This is a very small item when one considers the great amount of good that can result from reduced human suffering, lower operating costs and the actual saving of human lives.

Binghamton Group (Columbia System), Binghamton, N. Y. Promotes "Safe Working and Driving" to Aid War Effort

By CHARLES C. LAMB
Safety Director

The gas industry needs an unfailing supply of manpower and equipment to maintain the vast quantity of gas now required for domestic and industrial consumption in war-time America. More and more of our experienced employees are exchanging civilian attire for Uncle Sam's uniform. They must be replaced by men and women unfamiliar with gas utility operations. Therefore, to insure maximum efficiency in our most vital service, we must take extra precautions to prevent loss of time and production effort which are the inevitable results of accidents.

Realizing that aggressive action is the only solution to the accident problem, the Safety Organization of Binghamton Gas Works and other companies comprising Binghamton Group of the Columbia Gas & Electric properties, on August 1st inaugurated an intensive safety campaign for the month of August.

Designated as a "No-Accident August," this campaign daily focussed employee attention on the importance of working and driving safely . . . striving to build a framework of safe practices which, once formed, will be continued.

Acting on the assumption that any successful campaign of accident prevention must have not only the approval but the enthusiastic support of Management, the Binghamton Group Safety Committee first presented the plan to Company officials. Upon receiving approval of the Management, the following program was set in motion.

Campaign Features

1. A special campaign committee was formed, including in its membership key men from important operating divisions. Such committees were then set up to handle publicity, employee meetings, reports, etc.

2. Preliminary to the opening date of the Campaign, letters from officials and division heads were issued to all employees. A letter from the President, announcing the campaign, was sent to each employee ten days prior to the official opening of the campaign. This was followed one week later by a letter from each division head, addressed to those employees under his supervision, endorsing the campaign, and appealing for individual support.

3. The August issue of the company house organ, "The Gas Flame," featured the campaign.

4. The day before the opening date, each bulletin board throughout the organization displayed a large

SAFE DRIVING
WILL HELP DEFEAT THE AXIS
It Saves Lives, Equipment, Time and Money
MAKE AUGUST A NO-ACCIDENT MONTH
CHILDREN SHOULD BE SEEN
BUT NOT HURT . . .
So Drive Carefully!
DO YOUR PART TO
MAKE AUGUST A NO-ACCIDENT MONTH

Two of the weekly slogans for drivers pasted on the dash of car.

Sent on August 11, 1942

Never neglect a small scratch or cut.
If you are careful you may avoid these minor injuries entirely; but once they occur, treat with an antiseptic and clean sterile bandage.
"An ounce of prevention is worth a pound of cure."

President

BE CAREFUL!
Many bad injuries "Start from Scratch"
WORK SAFELY IN AUGUST

One of the weekly reminders sent to each employee.

campaign poster. Several of these posters were provided with easels which facilitated their use in other conspicuous places.

5. A collapsible desk calendar for August, carrying a Safety Message, was presented to each employee.

6. At the beginning of each week, a Safety message over the signature of the President was issued to each employee. To each message was attached an appropriate Safety sticker.

7. The above sticker was also attached to the payroll envelope which carried to each employee his pay-check for that week.

8. Each week a new safe-driving slogan card appeared on the instrument panel of each automobile.

9. Weekly payroll individual time reports during the month of August carried a campaign slogan, furnishing one more daily reminder of the Campaign.

10. Special cash prizes were offered for Safety suggestions of merit.

11. To supplement the work of the Publicity Committee, weekly two-minute safety meetings were held in various areas and departments. The first thing on Monday morning was the favored time for holding these meetings.

The Campaign was a complete success . . . no automobile accidents or lost-time injuries occurred during the month. It is the opinion of our organization that the beneficial effect of an intensive Campaign of this type should be far reaching.

Consolidated Gas Electric Light and Power Company of Baltimore, Md.

By H. H. BERMAN
Safety Engineer
Personnel Department

Safety plans are undergoing changes to cope with new problems produced by the impact of war.

In normal times the Company's safety program has received the support of Management, Supervisors and workmen. Today, ways and means are being sought to muster a greater degree of support. Accidents are being stressed as national losses.

Safety committee discussions frequently revolve around such subjects as: air raid shelters, fire fighting, first aid, blackouts. Last year such subjects would have been "out of order." Today, they are vital.

Posters, bulletins and safety messages reflecting the times are used. Publicity is geared to the war effort.

The Company continues to give recognition to departments which establish outstanding safety records. Trophies in the form of plaques and safety certificates are presented to deserving departments. This activity has felt the effects of war. Originally made of bronze, the plaques of 1942 have been replicas in paper.

Emergency treatment for the injured has been an important feature of the Company's safety program. Prior to December 7, 1941, there were 373 employees trained in First Aid under the Company's safety program. Since Pearl Harbor 309 additional employees have completed their training.

The present safety plan calls for continued instruction of employees in applying the prone pressure method of artificial respiration.

The Company's safety suggestion award plan is still in effect. Under its terms an employee receives a monetary award for submitting ideas which are adopted in the interest of accident prevention.

Employee protection during enemy bombing attacks has received close attention. Similarly steps have been taken to restore service in event of interruptions from bombings. The Company has procured special equipment for these purposes.

It is fully realized that the safety program must bear an additional load in the days ahead. The Company's plan is to continue to use those methods of accident prevention which proved successful in peace time. Innovations are expected.

The Peoples Gas Light and Coke Company, Chicago, Ill.

By ERNEST S. BEAUMONT
Director of Safety

The Safety Section functions as a part of the Personnel Department and the Director of Safety is responsible for the collection and analysis of accident data, the fire and safety inspection of all Company properties and the formulation of plans to promote the active interest and participation of management and employees in the accident prevention effort.

Our practice is to consider safety as a part of job operation, best accomplished through the personal interest of the employee combined with good training and control by the supervisory personnel. Executive interest is maintained by regular monthly meetings of the Executive Safety Committee with membership representative of the several Divisions of the Company. The Director of Safety as chairman reports on the current status of the program, special cases and plans. Full discussion assures practical measures and successful application as the details are passed on through the several supervisory levels.

Departmental Safety Meetings conducted monthly by the Superintendent or department executive are a further means of keeping the supervisory force well informed and active. Discussion centers around specific experiences and hazards. Inspection and control measures are developed along with improvement of training technique.

Some employee groups have monthly safety meetings, others meet quarterly according to the conditions. Employee interest is stimulated by the commonly used methods, talks, posters, moving pictures, first aid and the like. In our case a safety contest is one of the factors which has aided in maintaining a downward

trend in the face of generally increasing injury totals. In employees' meetings, they are invited to make comments and suggestions. The effect is indicated by the fact that our formal suggestion system receives about 15 to 18 hundred ideas each year and about 20 to 25 per cent of these involve some phase of safety.

This is, of course, a very brief outline of our safety organization. It does not include printed material as we feel that safety rules and operating rules should be inseparably tied together.

Consolidated Edison Company of New York

By E. P. DURFEE
Assistant Manager,
Insurance Department

The war effort has placed a new emphasis on the importance of organized safety programs in American industry. Now—with our production machine being stepped up to the highest point—it is more apparent than ever that accidents mean *waste* and therefore must be avoided.

The Consolidated Edison System Companies have had years of experience with an organized safety program. Its purpose is the careful enforcement of safety regulations and appreciation of the wisdom and desirability of such regulations on the part of workers.

Volumes could be written on the safety program at such points as the Astoria, Hunt's Point and the O'Connell gas plants. Thus coal bridges at Hunt's Point have basket guards on ladders, "dead man's" control, fire protection, rail and bumpers and power circuit protection, with danger signs including the grim skull and crossbones variety. In the producer house, doors are opened by counterbalanced levers, wooden gratings are provided for men who do charging work and water column try-cocks are operated at a distance. In the water gas plant, a "mechanical brain" directs the gas-making steps in proper sequence, a warning light flashes if valves fail to work and bright colored signals show whether carburetor, generator and superheater valves are open or closed. A full century of practical experience and research has promoted safety in gas production.

Nor does the safety program stop at the plant gate; in countless instances it aids non-operating personnel members.

Safety education is the mainspring of this program for System workers, employes in many departments receiving lectures twice a year, their foreman participating in monthly or bi-monthly Safety Committee meetings, attended by Insurance Department specialists, in which work procedures are "hashed over" and improved from a safety standpoint. Upwards of a thousand such committee meetings were held last year, while the industrial accident prevention lectures, given on company time by a corps of experts, were attended by more than 30,000 employes. In addition, all System workers are periodically re-instructed in the prone pressure method of resuscitation for victims of asphyxiation, drowning and shock, a safety program feature known to have saved many lives.

A comprehensive review of all the aspects of Consolidated Edison's safety program would take much more space than has been allotted for this article. However, the record of the past few years speaks for itself—

"In the past 15 years the number of lost-time accidents per 100 employes of Consolidated Edison System Companies has been cut 84 per cent."

The Ohio Fuel Gas Company

By C. F. BRONSON
Manager, Elyria District

For the year 1941, American industry established a record. A record which should serve as indictment of some of our accident prevention practices and policies. Industrial production lost 250,000,000 man-days of labor attributable directly to accidents. Illness is the only factor which accounted for a greater loss. During that period industrial accidents were responsible for ten times the loss that strikes afforded, two and one half times the estimated loss from absences, seven times the cost in production ascribed to labor turnover. Monthly comparison figures for the year 1942 indicate an upward trend of alarming proportions.

Safety and Accident Prevention plans and policies of the Columbus Group, Columbia System, have been developed to such an extent, circumscribed with so much appeal, that their applications are readily accepted by every supervisor in the organization as a part of his daily work assignment. It is this supervisor who, when he interviews an applicant for a position, attempts to determine, whether or not, he can perform the duties of his new job with safety. If the applicant is employed, the supervisor presents him with a manual in which is outlined a splendid presentation of the company's policies pertaining to safety and accident prevention, and a pledge which indicates that the employee will cooperate in every attempt to prevent an accident to himself or to his fellow employees. New employees whose assignments are considered hazardous are not permitted to work except as assistants to experienced personnel. He is always assigned to membership in some active safety committee. He is encouraged to join the first American Red Cross, Standard First Aid course, which is open to him. In the event his duties require him to operate a company automobile or truck, the new employee is never permitted to drive his vehicle upon the streets or highways until his driving ability has been tested by some responsible agency or person. His knowledge of state and city regulations and ordinances are checked. Safe driving codes and practices are discussed. He is taught the best methods for maintaining his equipment in the best possible condition.

The companies of our group have always appreciated the fact that wide spread employee interest in safety activities, is best stimulated and maintained through the adoption of some suitable contest plan. For that reason we have competed in the National Safety Council Industrial contest for large gas utilities for the past several years. Here is our record. First in 1938, in 1939, in 1940, in 1941, and second in the contest which closed June 30, 1942. Our frequency rate for the last mentioned year was 2.37

Another contest which has been received with real employee enthusiasm, is one of our own entitled, The August—No—Accident--Month—Campaign. For this activity Management provides suitable campaign materials in the form of posters, slogans, stuffers for pay envelopes, and many novelties which vary in character from year to year. The results of this campaign have always been gratifying, but the one which we concluded, August 31, 1942, when we worked the calendar month of August without a disabling injury to an employee of our group, established a record of which the employees are really proud.

Safety and accident prevention, when seriously considered, has provided the operating personnel of the Gas utilities with some of their most vexatious problems.

What Is the Efficiency of That Gas Plant Cooling Tower or Air Cooling Device?

By
W. F. Schaphorst, M.E.
Newark, N. J.

AIR CONDITIONING and refrigeration are being so commonly employed these days that in many cities the water problem is becoming acute. Water is needed for cooling in the refrigeration processes, and owing to the fact that water always has been abundant and is comparatively cheap it has been allowed to go to waste into the sewer. As a result cities have found it necessary to make restrictions regarding water consumption. The logical answer therefore is: use water cooling and water saving devices such as the cooling tower.

In addition to air conditioning there is the Diesel engine and other internal combustion engines which must be cooled. Much water has been wasted into the sewer in this way and it is not at all uncommon, now, to find cooling towers being used in conjunction with Diesels. For these purposes the cooling devices usually pay for themselves in a short time and are well worth while.

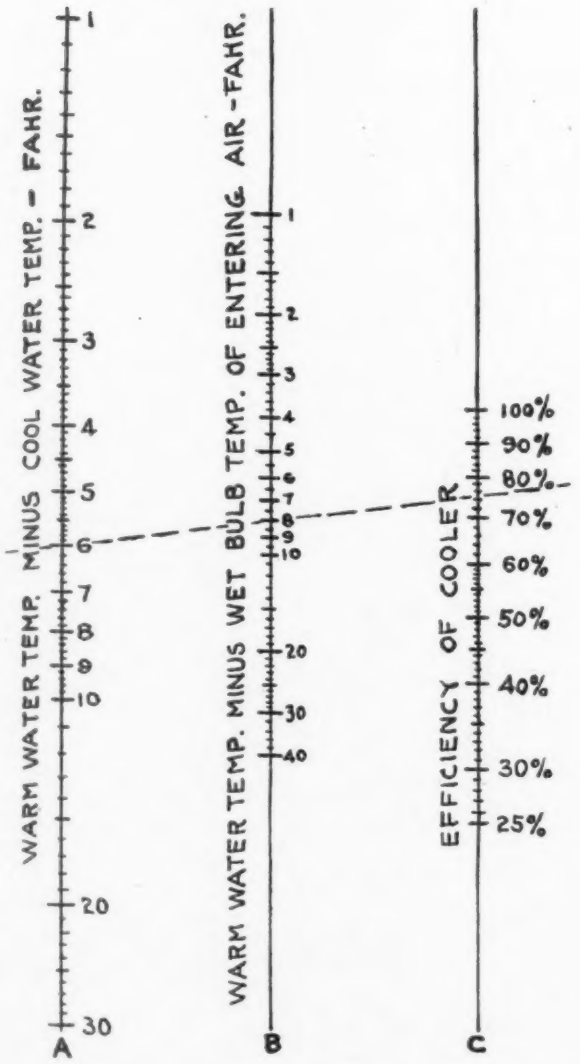
Herewith is a chart, prepared by the writer, for determining cooling tower efficiency. If you have a cooling tower, or are contemplating the installation of a device of that nature, efficiency is important. The chart is used as follows:

Subtract the temperature of the water after it is cooled from the temperature of the same water before cooling, and locate the difference in column A.

Then subtract the wet bulb temperature of the entering air from the temperature of the water before cooling and locate the difference in column B.

Now run a straight line through the two located points in columns A and B and the intersection with column C gives the efficiency of the cooling tower or cooling device.

For example, the dotted line drawn across the chart shows that if the temperature of the water before cooling is 88 and the cooled water temperature is 82 the difference, 6, is located in column A. If the wet bulb temperature of the entering air is 80, subtract from 88 and locate the 8 in column B. The straight line then gives the efficiency of the cooling device as 75%, in column C.



During summer months one should expect an efficiency of 65 to 70 per cent. If an efficiency of 90 per cent is reached by your device that may be regarded as good. An efficiency of 35 per cent would be called poor. Much, of course, depends upon weather conditions.

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POWER GENERATION

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for heavy duty main line service, in the larger capacities

ANGLE GAS ENGINE-COMPRESSORS
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VERTICAL CONVERTIBLE GAS-DIESEL ENGINES
for auxiliary station power service

UNIBLOC GAS ENGINE-COMPRESSORS
for limited space, for gas distribution service

OPPOSED TYPE MOTOR-DRIVEN GAS BOOSTER COMPRESSORS
design gives minimum shaking forces, for bad soil conditions

DUPLEX SYNCHRONOUS MOTOR-DRIVEN COMPRESSORS
for gas distribution service

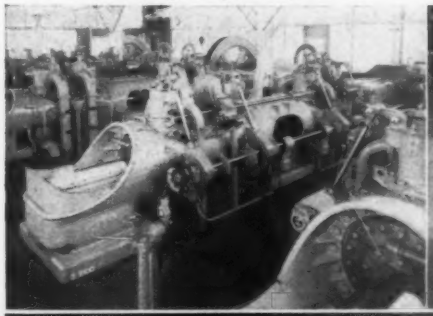
WORTHINGTON products are not built to serve for this period of emergency only, but to continue to operate for many years after industry returns to peace-time pursuits. Therefore there can be no letting down of the rigid standards that have been set for them as a basic Worthington principle.

It is our aim that Worthington equipment produced during this difficult period shall accomplish two purposes . . . first that it shall serve effectively and without interruption, on the many important jobs which it fills . . . and second that, in so doing, it shall make new friends, and retain the confidence of old friends.

To those plants where Worthington equipment is now in use, we offer the services of our district office engineers, and our headquarters staff, in checking conditions and performance, with a view to assuring continued operation at top efficiency.

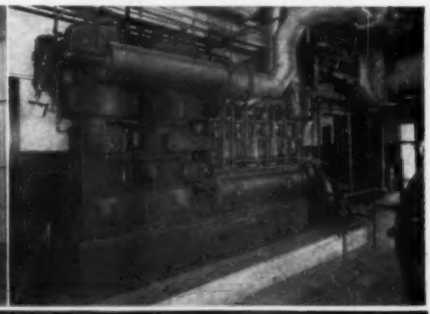
And in the planning for readjustment or expansion, whether for the war production program or the period to follow, the counsel of these specially qualified engineers is always available. M12.40

Horizontal gas engine compressors



An angle gas engine compressor unit

Unibloc gas engine with compressor



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Servel's Nutrition Program for War Industries

THIS is a nationwide industrial nutrition program for war workers which gas utility companies may make available to war plants in their communities, and which will enable such plants to help speed the nation's War Production Drive.

The project is in step with and in support of the Government's drive for manpower conservation through industrial nutrition, just recently announced. The Servel plan has been specifically designed to help speed up war production by building the health of war workers through improved eating habits in the plant cafeteria, home packed lunches, the plant neighborhood restaurant, at home, and it offers war plants, through their gas companies, much needed help in breaking the lost time bottleneck caused by poor nutrition and illness.

The plan has been developed in cooperation with the Nutrition Division and the personnel of the new Industrial Nutrition Advisory Committee of the Office of Defense, Health & Welfare Service, as a contribution to the war production effort.

It is based on the pioneering nutrition experiment which Servel, Inc., recently conducted among the thousands of war workers of its own plant in Evansville, Ind., now converted to war production. Incorporated in the program is the best experience of outstanding home economists, nutrition authorities and research leaders of the nation.

It is also an extension of the Home Volunteer Program Servel developed for the gas industry, and now being carried on by hundreds of gas companies throughout the country. The Home Volunteer movement is a "spontaneous" endeavor by the industry to help women of the land apply in their homes the principles of nutrition and conservation recommended by the government.

Though far from completed, the company's nutrition program has succeeded in four months, and with only a comparatively small percentage of employees actively participating to date, in effecting a 16 per cent decrease in time lost from illness. These figures are based on 100,000 man hours worked, as against those for the same period in 1941.

How the Program Works

It has been so set up that gas companies may present it to war plants in their communities through their local Government Nutrition Committee. Gas companies can begin the program immediately by contacting their local Nutrition Committee and setting up an organization structure. The various promotional and educational material has been prepared with this approach in mind.

Slogan of the program, featured in poster and pamphlet educational material is: "EAT TO BEAT THE DEVIL"! It shows the brawny fist of a worker (on which is printed "America's Increased War Production") delivering a telling blow to a "horned Hitler."

The principal steps involved in putting the "Nutrition in Industry" plan into effect entails enlisting the cooperation and ACTION of: (1) the war plant management; (2) the war workers in those plants; (3) the plant cafeteria; (4) the plant neighborhood restaurants; (5) wives of war workers.

Details of these steps are as follows:

1. Enlisting Cooperation of War Plant

A gas company representative, accompanied by a representative of the local Nutrition Committee explains the Plan in detail to the Personnel Director, Plant Doctor, Cafeteria Manager, and any other executives of the local war plant management who may be helpful in furthering the Plan in that plant. A presentation portfolio, entitled "Nutrition in Industry," which describes the complete program, is used by the gas company representative to convince the war plant management of the need for such a program in their plant. A pamphlet, "Operating Guide to Nutrition," which shows the plant management how to put the plan into effect immediately, is among the portfolio material.

The industrial nutrition program is so planned, the war plant may use all or any part of it as particular needs dictate.

2. Enlisting Cooperation of War Workers

In order to educate the workers to the need for following the basic rules of correct nutrition, so that they may give their best services to their country, the gas company will help the war plant to put on an educational campaign with health posters, folders, publicity stories in the plant paper, buttons, etc., all keyed to the fighting theme, "EAT TO BEAT THE DEVIL"! The posters include both official government nutrition posters outlining basic daily food requirements, and specially designed action-getting posters on the "Eat to Beat the Devil" theme. Other similar displays for the plant cafeteria include posters and placards—some of them three dimensional—giving "Victory Plate" suggestions; typical, balanced mid-meals for both day and night shifts, etc. In addition, health folders and pamphlets giving practical, authoritative information on foods and nutrition, will be placed in the pay envelopes of workers.

Vegetables for good eyesight — is prescribed to the industrial war worker in this Nutrition In Industry campaign poster being distributed through the local gas companies to war production plants interested in improving the food selection habits of workers. The findings of the plan result from experiments of Servel, Inc., and nutrition authorities.

3. Enlisting Cooperation of Plant Cafeteria

Whether or not the plant has a nutritionist, the gas company home economist can help the plant cafeteria manager and chef plan low-cost, balanced meals which conform with the recommendations of Government nutrition food rules. She also can recommend daily "Victory Plate Lunches"—a low-cost, balanced meal based on government nutrition recommendations. Similar assistance and advice is given the operators of the plant "Snack Wagons" with the aim of raising the nutritional value of the foods carried by them. Effort will be made to get operators of these wagons to feature milk, fresh fruit juices, etc. Where the plant employs its own nutritionist, her direct cooperation will be sought in the program. Where the plant does not have its own nutritionist, the services of the local Nutrition Committee or the State Agricultural Extension Service may be obtained to assist in this work, as well as those of the local gas company home economist.

4. Enlisting Cooperation of Plant Neighborhood Restaurants

A gas company representative will assist the war plant in forming a special committee to contact restaurants, lunch rooms and cafeterias in the vicinity of the plant and secure their cooperation in providing balanced meals for workers.

Restaurants and lunch rooms agreeing to support the Government's "Nutrition in Industry" program will receive a specially designed wall display. They will be asked to feature "Victory Lunches" and to display Government nutrition posters; also "Eat to Beat the Devil" display materials. Those whose service measures up to the standards for balanced nutrition will receive a Pledge of Cooperation, for display in their establishments. This Pledge states that the restaurant is contributing to the war effort in cooperation with the war plants of the community by serving food that conforms with Government food rules.

5. Enlisting Cooperation of Wives of War Workers

Emphasis here will be on helping wives, mothers and housekeepers of war workers pack nutritious *lunch boxes* for the war workers in their families, and to prepare balanced, healthful meals for them at home that supplement those eaten on the job.

Community classes for housewives conducted by the local nutrition committee at convenient neighborhood locations round out the family program.

Left: War workers eating the right kind of nourishing foods can help drive a nail in the coffin of the devil among devils. The proper balanced meal makes for strength and greater production, this will be shown in the "Nutrition In Industry" plan that Servel, Inc., of Evansville, Ind., will make available soon to war industries. The Servel plan based on more than four months research shows that eating the right foods resulted in a 16 per cent reduction in time loss due to illness; fewer rejects; less accidents at the machines and greater production for the boys fighting the big battle at the front. Right: Well balanced meals for war workers are important for the health of the workers as well as for greater war production. At the cafeteria of Servel, Inc., Evansville, Ind., the improved eating habits of the employees has shown a marked reduction in absenteeism due to illness, reduced number of accidents at the machines, fewer rejects and greater production. The "Nutrition In Industry" plan pioneered by Servel will soon be made available to war industries through local gas companies.

How Servel's "Nutrition in Industry" Program Originated

Servel, Inc., formerly devoted to the manufacture of gas refrigerators, now converted to 100% war production, is facing, along with other war industries of the nation, the acute problem of an alarmingly high percentage of lost man hours due (surveys show) to *illness* in nine cases out of 10, caused by *faulty nutrition*, directly or indirectly—American industry is losing a total of 24,000,000 man hours every month because of illness.

With the grave shortage of industrial labor which the country faces; and the urgent need for speed-up in war production, this loss of man hours *can play havoc with war production schedules*, unless corrected. The problem grows increasingly acute as the stress of longer working hours, seven-day work weeks and frequent overtime causes diet deficiencies in war workers to show up very quickly. The need is to keep every worker on the job all the time.

Servel's action on this problem started four months ago when it launched a series of nutrition experiments with the families of typical workers in its plant, at the suggestion of the Office of Defense Health and Welfare Services. These followed the recommendations set forth in the National Nutrition Program, and included menus and meal planning suggestions prepared by the company's Home Service Department.

These studies revealed that the home-packed lunch and the mid-shift meal were especially important. As a result, many changes have been made in these lunches and the food served in the plant cafeteria. Out of these experiments, a broad-gauge, food-for-health program has been initiated for Servel employees.

The Gas Industry's Qualifications

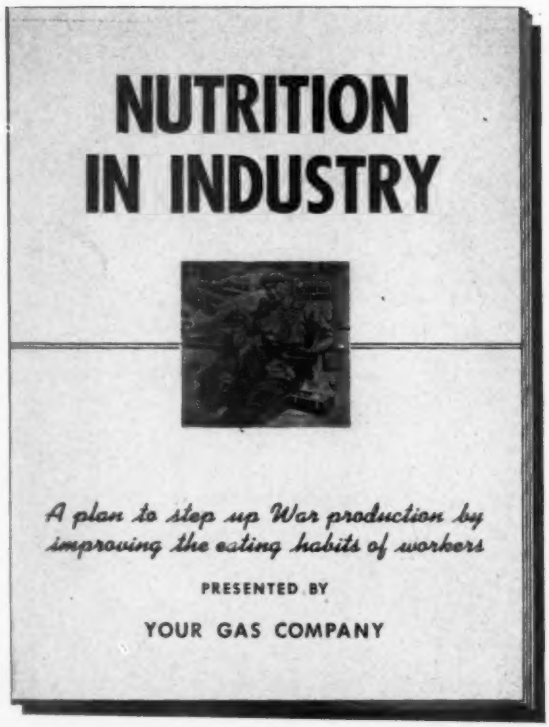
The gas industry provides an ideal channel through which needed assistance can be given the nation's war industries in solving the industrial nutrition problem, and the accompanying problem of absenteeism.

The gas companies have been doing food and nutrition work for years, giving advice and aid to mil-

lions of workers' wives throughout America in the planning, preservation and cooking of foods that keep us fit. They can provide the trained home economists and nutritionists; the demonstration rooms, the kitchens and the appliances needed in the effective operation of such an industrial nutrition program.

A large number of gas companies already are active in the wartime nutrition field. Many have taken steps to affiliate with the National Nutrition Program of the Government, either through the Red Cross, or their local Defense Councils. Other gas companies are now doing purely volunteer work in nutrition among organized groups and general consumers.

Servel, which long ago discovered that nutrition went hand-in-hand with war production and has since pioneered many interesting developments to improve the eating habits of its thousands of employees, has been working with and interested in the food and nutrition problem for years; naturally so, since it has been working with food problems for the past 15 years, in connection with the scientific manufacture of the gas refrigerator. Its endeavor now in developing the "Nutrition in Industry" Program for war industries through the gas utility companies, is to act as an agency to coordinate the gas industry's endeavor, as a unit, to solve the increasingly acute industrial nutrition problem.


NUTRITION
IN INDUSTRY
A plan to step up War production by improving the eating habits of workers
PRESENTED BY
YOUR GAS COMPANY

Cover design of booklet contained in plan book which gas company executives may present to executives of war industrial plants for use in the "Nutrition in Industry" project to step up production by improving the eating habits of workers. The plan is based on the experience of Servel, Inc., and nutrition authorities.

This problem is primarily the problem of the war industries themselves, according to the findings and conclusions of the National Research Council. While the Government can and will do much toward this end, it is in the plant itself where ALL the workers can be reached ALL the time—where they work and eat—that a consistent, comprehensive program of education and nutrition can best be carried through, the Council states. Although the idea of nutrition in industry is not new, no ORGANIZED PROMOTION of it has been made heretofore. Those who have seen and studied Servel's "Nutrition in Industry" Program declare it by far the most complete and helpful program yet offered to war industries.

From "Way Down Under"
come the highest grade of selected lambskins.

New Zealand Skins **are noted for their small pores and fine texture. Those we treat conform to definite standards of thickness and absence of holes, scratches or blemishes.**

These we use in the manufacture of

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a product which has been recognized with universal acceptance by the Gas Industry for over 50 years.

Our leathers stand up in the meter under all variable conditions. They are strong, pliable and unaffected by heat, cold or dampness.

We also manufacture Oiled Meter Leather for Iron and Tin Case Meters, Governors and Regulators.

Superior to any substitute offered for this purpose.

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National Chemical Exposition

Regarded as an important contribution of the chemical industry to the war-time effort, the National Chemical Exposition will be held November 24 to 29 at the Hotel Sherman in Chicago.

Added importance will be given the show, second to be sponsored by the Chicago Section of the American Chemical Society, because of the conference to be held in conjunction to be addressed by leaders of the industry, educators and other authorities. The program is now being arranged by the conference committee.

"We are planning an interesting and momentous conference which will be in the nature of a forum. This parley will get under way at the opening and continue through the entire period of the show. A committee is now preparing a schedule of industrial motion pictures which will also add to the interest of the exposition from an educational standpoint."

Water Heater Check Chart Enables Utility To Improve Water Heater Service

By
Jimmy E. Kearns
St. Louis, Mo.

A GRAPHIC means of demonstrating to the homeowner the efficiency importance of his water heater for the length of the war and the wisdom of putting it in first-class condition has been developed by Southern California Gas Company, Los Angeles through a 26-point "check chart" carried by all service men.

Water heater maintenance has become a major issue with Southern California Gas in recent months, and was energetically promoted during the entire summer. A direct mail program, newspaper - advertising, house to house solicitation, and a general "broadside" to all automatic gas water heater owners, was included in the promotion which began late last spring. No attempt was made to "sell" owners service in making contacts, but rather, a system of educating him to the importance of his heater and offering to check it for the future. Each water heater owner on the list was sent a folder developed by the company which outlines the advantages of ready hot water at all times; mentioned various ails of heaters in service for many years, and invites the owner to have a thorough checkup made.

The chart used for this checkup has been worked out from the results of inspecting 1000 water heaters in years past, and is headed "Check Chart—Survey Facts Concerning Your Present Water Heating Service." Following is space for the name and address of the owner, the charge, type of building, make of heater, serial number, size, and complete details about the heater service, including its years of service, gallons per minute, output, capacity, location, etc. This chart is shown to the automatic gas water heater owner before any inspection is made, with the information that every defect or need for service will appear on it as the serviceman checks the 26 points listed. These are:

Checked

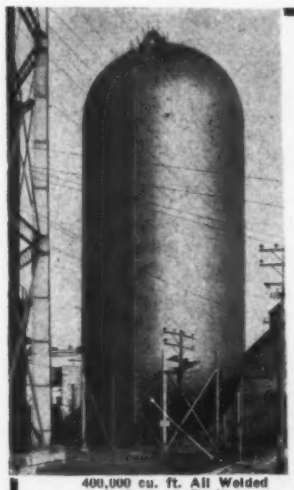
1. Faucets for leaks
2. Faucets for loose washers
3. Water hammer (shock pressure)
4. Number of hot water faucets
5. Hot water pipes for leaks
6. Fixture drain stoppers
7. Water pressure, excessive, yes —— no ——
8. Cold water inlet valve
9. Main gas valve to heater
10. Pressure relief valve
11. Shower connections for by-pass
12. Heater for lime deposits
13. Vent for condensation
14. Draft conditions
15. Main burner flame
16. Pilot adjustment
17. Pilot location
18. Water temperature
19. Automatic pilot, yes —— no ——
20. Heater vented, yes —— no ——
21. Proper draft hood installed
22. Roof caps
23. Type of tank A. full floating B. flue
24. Thermostat location
25. Air supply
26. General support and installation.

Space for placing a check after each of these points is provided on the check chart, which after a thorough inspection, tells neatly the story of its condition and what service work is needed to put it back in tip top condition. This is handed to the home owner, who can determine whether or not he wants the work done.

In the event he does, his future good will as well as that of the present is insured by a similar check sheet which shows the work done, and gives the owner a thorough understanding of how well his heater has been serviced. This sheet is headed "Work Performed" and lists

1. Installed washers —— number
2. Installed valve seats —— number
3. Cleaned main burner ports, yes —— no ——
4. Cleaned Heating surface, yes —— no ——
5. Cleaned Pilot, yes —— no ——
6. Cleaned thermostat, yes —— no ——
7. Adjusted thermostat, yes —— no ——
8. Inspected water from heater—clear, sand, rust, lime . . .
9. Signature

This is made out in triplicate after service work is done, one sheet going to the "future business" file in the appliance department, the second to the service shop office and the third being sent to the customer for his own reference. Thereafter, the owner can be depended upon to appreciate the care given his water heater. Southern California Gas Company has in this way inspected and charted the service of an average of 300 water heaters per month, and thus kept service departments active not only on water heaters, but all gas-fired appliances and heating equipment in Los Angeles homes.


400,000 cu. ft. All Welded Pressure Tank

if in the market for a gas holder, now or later, discuss your requirements with

STACEY BROTHERS

designers and fabricators of the famous "Stacey-Klonne" & Telescopic Gas Holders . . . and of the famous "Stacey Bullet" Pressure Holders.

AND IF YOU WANT TO SAFEGUARD your present holder capacity, you will find our specialized GAS HOLDER INSPECTION SERVICE the perfect low-cost answer.

Scores of large and small gas companies are benefiting from this expert check-up service. Write today for details!

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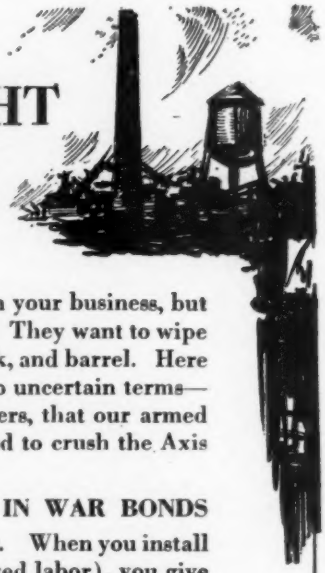
TARGET FOR TONIGHT

. . . Your Business?



Maybe they won't actually come and drop a *bomb* on your business, but the Axis war lords have their eye on it, just the same. They want to wipe it out as a competitive force—or take it over lock, stock, and barrel. Here is a threat that you can reply to *now*, today, and in no uncertain terms—by buying War Bonds to the very limit of your powers, that our armed forces may have the guns, tanks, and planes they need to crush the Axis *once and for all.*

THE GOAL: 10% OF EVERYONE'S INCOME IN WAR BONDS

Every American wants the chance to help win this war. When you install the Pay-Roll War Savings Plan (approved by organized labor), you give your employees that chance. For details of the plan, which provides for the systematic purchase of War Bonds by voluntary pay-roll allotments, write: Treasury Department, Section S, 709 12th St. NW., Washington, D. C.

Buy War Savings Bonds

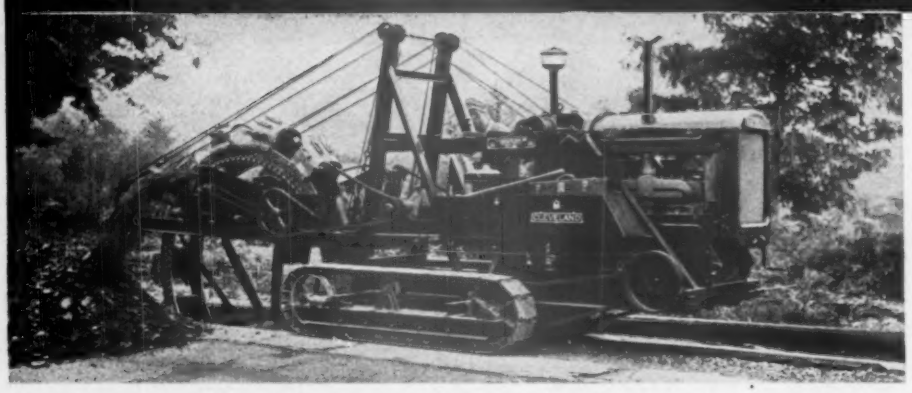
This space is a contribution to America's All-Out War Program by

Gas Purifying Materials Co.. Long Island City, N. Y.

. . . For Over 20 Years

"CLEVELANDS" Have

- RAISED PERFORMANCE LEVELS
- DECREASED INITIAL COST
- LOWERED OPERATING COSTS



"Cleveland's" National Defense Cooperation is 2-Fold

1st—Supplies equipment for Defense Pipelines and all branches of the United States Military and Naval Services.

2nd—Releases thousands of tons of vitally needed steel for armament, tanks, ships, etc., because of weight-saving design and construction.

★ Ever since its entrance into the ditching field, over twenty years ago, "Cleveland" has blazed a path of fresh ideas—constant improvement. Unswerving continuance of this policy is our promise for the future, so that you, whenever you purchase a new Cleveland, can be assured of the most modern in engineering design, backed by the best there is in construction.

BUY WAR BONDS—TURN IN ALL SCRAP RUBBER AND METAL

THE CLEVELAND TRENCHER COMPANY

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"CLEVELANDS" Save More . . . Because they Do More

Take An Inventory Now

All Industry Advised To Obtain Replacements As Nation's Military Manpower Needs Increase

By

Major General Lewis B. Hershey, U. S. A.

Director of Selective Service

MANPOWER is a most important strategic material of today. Every employer should make a prompt inventory, appraisal and analysis of the manpower in his own plant as he would inventory his stock pile. In order to keep production going and at the same time furnish men for the armed forces, industry should now establish an orderly replacement program.

In order to secure temporary deferments for essential men while he is training women, young men, older men, men physically handicapped or those with a high degree of dependency, the employer should know the fundamental principles in the operation of his local Selective Service Board. Certain steps should now be taken by each employer. He should know how many men on his pay roll are between the ages of 20 and 45. He should investigate the classification of every one of those men. On the basis of such an inventory he should prepare to plan ahead and train men for replacement of those who must necessarily enter the armed forces if we are to have the sort of army which can win the war.

Deferments Temporary

Deferments, granted so that employers may train women or men not liable to early induction, are temporary deferments; they cannot exceed six months and in many cases may be for only thirty, sixty, or ninety days. The Army today has to train a bomber pilot within a period of eight months to operate a very technical machine with an instrument board which puzzles an expert. Why, therefore, should industry insist that it assume that it can take two or three years to train men for industrial tasks not nearly so complicated?

The fundamental purpose of every deferment of a registrant is to allow an employer to train a replacement. Only in a few rare instances can an employer expect to have these temporary deferments continued for more than the six months period. These are only in cases where an abnormally long period of training is required for a replacement and the eight months needed in which a bomber pilot can be turned out now, is something to remember in this connection.

Employer's Responsibility

Employers may seek the deferment of their necessary men with or without their consent.

Here is how they go about it.

On page 3 of the Selective Service Questionnaire (Form 40) which is sent to each registrant before he is classified is the following:

INSTRUCTIONS.—If your employer believes that you are a necessary man in a necessary occupation, it is his duty to fill out Form 42A requesting your deferment. You may also attach to this page any further statement by yourself which you think the local board should consider in determining your classification. Such statement will then become a part of the questionnaire.

This is on all the questionnaires distributed during the past six months. The fact that the Selective Service System now specifically mentions the filing of Form 42A as the manufacturers' duty is a clear indication of the Selective Service System view on the responsibility of each employer in this matter.

The employer can secure Form 42A at the local board and the local board will consider the employer's request when the form is properly filled out and signed.

If such request should be denied because the man, after consideration of the claims offered for him, is not considered to be indispensable to the company's operation, and is needed more in the armed services, the local board will advise the employer of its refusal of such an occupational deferment.

The local board does this by sending to the employer, at the same time it notifies the registrant of his classification, a Form 59.

May Make Appeal

There are ten days after Form 59 is mailed by the local board to the employer during which the employer can appeal the registrant's case.

The registrant will not be ordered to report for induction during this ten-day period.

In order to take an appeal the employer simply has to sign his name to Form 59 which he has received, and return it to the local board; or in case the Form 59 is not received from the local board, any written request will have full value to make such an appeal effective.

When Form 59 is returned by the employer the appeal procedure becomes automatic.

All necessary forms are available at the local board in the employer's immediate vicinity or at the office of the State Director of Selective Service.

If the local board and the appeal board deny the appeal for the occupational deferment of a key man, the employer may then bring the matter to the attention of the State Director at the State Selective Service Headquarters, with the request that the case be reopened or appealed by him to the President.

Definite Duty

A double duty rests upon the employer. He should personally know what his manpower situation is. He should not leave the job to a minor employee to decide who is necessary. The employer who delegates the task of filing a request for deferment to a clerk, the executive who does not make a complete inventory of his

whole plant today, is negligent. Likewise, the employer who files requests for deferment of men who can be replaced by women, or others, is keeping reinforcements out of an Army which is battling for us all. The employer engaged in essential war production who has been required to greatly expand his plant and who then fails to request deferment for his key men is also negligent.

A good rule to follow: Don't ask deferments for any men who can be replaced by training another individual not likely to be eligible soon for service in the armed forces.

Make an inventory, request deferment for any man whose immediate going into the armed services would retard production of vital war material or other services essential to the war effort, or who is needed to maintain national health, safety and interest.

Only when an employee is working in a critical occupation within an essential industry should a Form 42A be filed for his temporary occupational deferment.

Make Replacements

Yes, an inventory within a man's own plant is called for; also an appraisal and analysis of the manpower in the community. There is many a man over 45, or a man physically handicapped, or a woman who can do that job that the 23-year-old boy is doing who took a 12-weeks course at a learn-quick school.

There are not more than sixty million people in this country who are capable of effective productive effort. These men and women represent our total manpower available to win the war. They must do everything that must be done in a total war; maintain transportation, communications and utility systems, maintain public services, grow food for ourselves and our allies, mine the metals and produce the raw materials, fabricate and produce the amount of consumers goods necessary to maintain even a restricted national life and the supplies, weapons and munitions of war; also most of all they must provide the men who land on strange shores in far places, the men who carry the fight to the enemy on a multitude of far-flung frontiers. The rest of the population who mine raw materials and produce the weapons with which these men fight must be a self-disciplined team working in unity. The individual personal convenience, comfort or pleasure, or the convenience and ordinary leisurely replacement programs of the employer, will have to be given progressively less consideration as the war gets tougher and the casualty lists grow.

When we hear of the big armies we are going to raise, we must all remember that it takes at least five men or women to produce what they eat, use, fight with, and wear. With less than sixty million availables in this country, those figures are worth deep consideration.

100% Reduction in Bell-and-Spigot Joint Leakage . . .

Reported by Many Users of "Carboseal" Anti-Leak for Correcting Leakage in Dry-Gas Systems

"CARBOSEAL" Anti-Leak has been on the market since 1935 and has proved its value for long-term correction of bell-and-spigot joint leakage. Its use is a routine procedure in the maintenance programs of more than 250 gas companies. The Table of Leakage Reduction, compiled from hundreds of test results on file, shows results typical of general field experience.

TABLE OF LEAKAGE REDUCTION

Diameter of Main—Inches	Length of Main—Feet	Percentage Leak Reduction
8	620	100
6	582	95
6	92	100
4	1,200	100
4	1,700	91
3	618	100
3 equiv.	43,800	60

"Carboseal" Anti-Leak is especially recommended now because it . . .

1. **Saves labor. Only a small crew is required to apply "Carboseal" Anti-Leak.**
2. **Saves critical materials. Quantities of steel and rubber are required in the mechanical method of correcting bell-and-spigot joint leakage, but not in the treatment by "Carboseal" Anti-Leak.**
3. **Saves money. The average cost of "Carboseal" anti-leak treatment is about 50 cents per joint, a fraction of the cost of leakage correction by other means.**
4. **Saves time. Application of "Carboseal" Anti-Leak requires an average of four filling connections to the main per mile—excavation and repaving are almost entirely eliminated.**

For further information, write for the book *Correcting Leakage in Gas Distribution Systems with "Carboseal" Anti-Leak*. It will be sent to you without obligation.

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York, N. Y.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

The word "Carboseal" is a registered trade-mark.

World's 1st Gas Holder Saves English Factory

The world's first holder erected in Birmingham, England, in 1799 by William Murdock, inventor of a method of distilling fuel gas from coal, saved a factory from destruction by fire during one of the German air raids on the Birmingham area recently.

Now a rusty relic, retained more as a museum piece than anything else, the holder is used as an emergency water reservoir. It came in handy when a nearby factory caught fire.

The Gas Industry's National Advertising Program

Results to Date—Plans for 1942-43

Presented by Committee on National Advertising, American Gas Association

ON JUNE 30th the gas industry completed its sixth year of national advertising. Nearly three million dollars have been invested in this promotional work and there is abundant evidence of its accomplishments to date.

In planning to reach this objective three types of advertising have been carried on generally over the years.

One has been devoted to the promotion of the cooking load and has featured the latest models of gas ranges, including CP models. This advertising has appeared in the most influential women's magazines with a few insertions in *Life* and the *Saturday Evening Post.*

Another national campaign has presented the four major uses of gas in the home—cooking, water heating, refrigeration and house heating—with about equal space devoted to each of the uses. In the industry this has become known as "The 4 Big Job" series.

The third campaign has promoted the use of gas fuel and modern gas equipment in those industrial and commercial fields which have been selected as of greatest value from the standpoint of potential load and profit possibilities. Trade papers with a strong circulation coverage of these fields have carried the advertising.

From various consumer surveys we have definite evidence that our advertising has created a wide-spread public conviction as to the modernity of gas and gas appliances; that it has sold present users of gas on the special virtues of this fuel and has helped to win many new customers. It has served to establish the leadership of our product and appliances.

It has played an important part in improving the morale of the gas industry and has injected new confidence and vigor in all divisions of the personnel.

It has changed the direction of public thinking as to the future of the gas industry and has impressed bankers, insurance company officials, Government officials, and others in commanding positions, with the gas industry's stability and aggressiveness. It has also created new respect for the gas industry in the ranks of other influential industries whose interests are allied.

It has aided local gas companies in their relations with the public as well as with appliance dealers and has been of material assistance in convincing dealers of the desirability of stocking gas appliances when they might otherwise have been doubtful. Now with company sales forces and dealer organizations reduced, causing a loss of many thousands of daily contacts with present and prospective customers, our national advertising is acting as a strong connecting link between the industry and the public.

During the period of this national advertising program real progress in building public acceptance of gas has been made. Now the job is *to hold this public acceptance—to protect the advertising investment that has already been made.* This principle was well demonstrated during World War No. 1 when many advertisers learned the value of continuous advertising during a war period in order to protect their sales position in the post-war market.

The Gas Industry's Opportunity In 1942-43

In approaching the 1942-43 national advertising program the gas industry faces new problems and new opportunities. It is true that, generally speaking, gas appliances are not obtainable; and there is at least a possibility that in certain areas the Government may put some restrictions on the utilization of gas. However, like most other industries operating under priorities and Government regulations, the gas utilities must carry on with a view to the time when the war will be over and business will get back to normal operation. When that time arrives, whether it be one year from now or five years, the gas industry must be ready to take every advantage that the post-war period will offer. It must not in the meantime have permitted itself to fall in public estimation or to lose the position and prestige which it now has.

Under present conditions electric appliances cannot make any important inroads on gas. But the electric industry can make tremendous inroads in PUBLIC IMPRESSION—if the gas industry permits it to do so by pulling its own punches NOW.

1942-43 Campaign Will Be Adapted to War-Time Conditions

Naturally, the present situation requires a new type of gas advertising geared to America's war effort and in keeping with the existing state of public thinking. In considering this change the Committee on National Advertising has weighed several advertising possibilities bearing in mind that the gas industry, like all other industries in America, has the utmost at stake in the winning of this war. Beyond that it is the desire of the gas industry to maintain its high standing in the economic life of the country so that when the war is over it will occupy a favorable position with both the Government and the public.

War Effort Series. From a number of ideas discussed with advertising counsel it is the unanimous opinion that the most effective general advertising the gas industry can sponsor at this time is a campaign devoted to the tremendous contribution gas fuel is making to the nation's war production. The basic idea of this new copy is to present certain outstanding industrial applications of gas in dramatic fashion and relate them closely to the domestic use of gas by pointing up the fact that the same fundamental qualities — speed, dependability, controllability and economy — make gas the preferred fuel in industry and the home alike.

One feature of the "war effort" series which has given it strong support is the fact that the advertisements to be published in the nation's three leading weeklies lend themselves admirably to local newspaper use. Mats of the magazine ads in several sizes will be made available to the industry.

Industrial and Commercial Gas Advertising in 1942-43

One of the inherent weaknesses of

our product has always been its lack of glamour and drama, as compared with electricity. Now, in our all-out War Program, gas finally comes into its own. Now, for the first time, gas has a really dramatic story to tell. We propose to continue to tell that story of gas as widely and as effectively as possible.

The plan is to have advertising copy keyed definitely to the war program, with the thought in mind that insofar as possible the advertising shall be designed to make a definite contribution toward the goal of winning the war just as quickly as possible. This will be done in a series of advertisements which will combine the prestige story of gas with the offer of service by gas company industrial engineers to help customers get maximum efficiency out of their present gas equipment.

The other story—of service to industrial and commercial gas customers—will be the simple straightforward one of offering the engineering skill and knowledge of gas company personnel to customers, with the one objective of helping them to get the greatest possible efficiency out of their equipment.

Such service will help customers to get greater production from their present gas equipment; it will help in the important task of conserving gas and in making present equipment last longer, both of which accomplishments bear directly on the war effort. And in addition, it will in itself be a valuable prestige and goodwill builder for the entire gas industry.

C-F
A few Regulators
representing a full line for all
needs of PRESSURE CONTROL
Gas, oil, steam, water, air, at any pressure up to 2,000 pounds, can be controlled and handled at reduced pressures as desired, by use of the proper C-F Regulators. For all pressures up to 600 pounds, standard designs are suitable. For pressures above that limit special designs are adapted according to conditions of use. Please state your requirements and suggestions will be offered.
THE CHAPLIN-FULTON MFG.CO.
38 PENN AVE. PITTSBURGH, PA.

American Soldiers' Rations

In 1790, according to the official records, the army of the United States had a total personnel of one hundred men. The daily ration allowed by Congress for these men was 1 lb. of flour, ½ gill of spirits, 1 lb. of fresh or salt beef, ¾ lb. of pork or bacon. The spirits continued to be a part of the American Soldier's ration until June 29, 1865, at which time the whiskey ration was eliminated.

Here is today's garrison ration for an American soldier:

Beef—Fresh or Frozen	10	oz.
Bacon	2	"
Chicken—Fresh or Frozen	2	"
Pork—Fresh or Frozen	4	"
Eggs—Fresh	1	each
Beans—Dry—Any kind	0.5	oz.
Rice	.6	"
Rolled Oats	1.5	"
Beans, string, canned	3	"
Corn—canned	2	"
Onions	2	"
Peas—canned	2	"
Potatoes—fresh	10	"
Tomatoes—canned	2	"
Apples—canned	1.5	"
Jam or Preserves	.5	"
Peaches—canned	1.2	"
Pineapple—canned	1.2	"
Prunes—canned	0.3	"
Coffee—Roasted & Ground	2	"
Cocoa	0.3	"
Tea	.05	"
Milk—evaporated	1	"
Milk—fresh	8	"
Butter	2	"
Lard—& substitute	1.28	"
Flour—wheat	12.00	"
Sugar	5	"
Macaroni	0.25	"
Cheese	0.25	"
Flavoring, spices, etc.	1.394	"

This list totals to 80 and a fraction ounces or approximately 5 lb. of food daily, and if you read the specifications, you will be persuaded that it is the best food in the world, the best food that money can buy.

. . . an unbroken dividend record for fifty-six years

THE UNITED GAS IMPROVEMENT COMPANY

UGI

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

METER REPAIR PARTS

FOR
ALL MAKES — ALL SIZES OF METERS

LARGEST GAS COMPANIES NOW USING OUR PARTS

SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

SAMPLES AND PRICES GLADLY SENT

— o —

LAMBERT METER CO.
PLAINFIELD, NEW JERSEY

GLOVER-WEST

CARBONIZING SYSTEMS

• *boost* production

• *cut* fuel costs

440 CARBONIZING PLANTS, in 24 countries, testify to the outstanding advantages of GLOVER-WEST Systems.

Today, with the fate of civilization depending on the speed and efficiency of our war-output, these advantages cannot be overstressed:

GLOVER-WEST CARBONIZING SYSTEMS
- ***LOWER*** Fuel Consumption and Maintenance
- ***FACILITATE*** Operation
- ***PRODUCE*** dryer, cooler Coke
- ***REQUIRE*** less Ground Area
- ***INSURE*** greater Flexibility

Let us give you full details. WRITE:

WEST GAS IMPROVEMENT CO.
424 Madison Ave., New York, N. Y.

War Production Board

Office of Price Administration

A sample statement showing the method which shops servicing electrical and gas appliances and radios must file with their local War Price and Rationing Board by September 10 was released September 2nd by the Retail Trade and Services Division of the Office of Price Administration.

At the same time the Division set forth the four main things which shops supplying these services must do to comply with the Service Regulation (Maximum Price Regulation No. 165, as amended).

Included among services for which this regulation sets top charges (maximum prices) are the repair, maintenance or rental of:

Electrical Appliances (small or portable, commonly used in homes, hospitals, hotels, institutions, offices, retail establishments, or schools)

Electrical household or kitchen equipment whether from or in homes, hospitals, hotels, offices, retail establishments, schools or other institutions (including but not limited to food mixers, ironing machines, lamps, ranges, refrigerators (household), sewing machines, vacuum cleaners, washing machines)

Gas Appliances (except gas furnaces, industrial equipment, unit heaters, or water heaters)

Also included are the prices of all commodities, such as *parts* and *accessories*, when sold in connection with the sale of a service.

The amended regulation covers the maximum price of these services at all levels—retail, wholesale and contract. Prices must not exceed the highest price charged in March for the same or similar service even though prices for labor or material may have increased since then.

If you charged a flat or definite amount for a specific service in March, that is the most you may charge now for that same service. Thus, if you charged $1.50 to clean and adjust burners on a gas range, that is your ceiling.

On all service work which in March you priced according to a regular rate or pricing method (such as time records or labor manual used in connection with an hourly customer rate), you may use that rate or pricing method in determining your maximum prices for such services. But the rate or the charges for each item in the service (labor, material, etc.) must be limited to those in effect in March 1942. For example, you repair washing machines. In March it was your practice to charge $1.50 an hour for labor, profit and overhead, plus the cost of parts at the manufacturer's list price. In March you did not happen to replace a leaky tub, but if you had done so, you would have priced it by your usual method. Your ceiling price for replacing a leaky tub is now $1.50 an hour for labor, overhead and profit, plus the manufacturer's price, as quoted in March, for parts.

You may not make an extra charge for delivery or any other part of the service which was included in your March price.

You must continue to give the same discounts and allowances which it was your custom to give in March.

Records

Keep all records of any kind which have any bearing on prices you charged in March. Such records would include duplicates of customers' sales slips, invoices, work orders; also posters, display cards, advertisements, letters, post cards, etc., in which service prices were quoted.

The regulation requires you to keep your list up to date and complete by adding to it descriptions, prices, rates, and pricing methods and charges for all services sold by you for the first time after March 1942 which are not the same as or similar to, or are not priced by the same rate, or same pricing method and charges, applicable to services for which prices have already been filed.

If you have usually given a duplicate of the work order or any kind of sales slip as a receipt for money paid, you must continue to give whatever kind of receipt you customarily gave.

REED'S Razor Blade 4 WHEEL Pipe Cutters

IDEAL FOR ANY TRENCH OR OTHER CLOSE QUARTER JOBS

$5.46 F. O. B. ERIE

Capacity ½" to 2"

Weight 5 lbs.

The REED FOUR WHEEL Cutter operates with a short back and forth motion through only one-third of a circle. Each of the four wheels exerts the same pressure on the pipe, and all 4 therefore cut evenly and completely through the pipe at the same time.

Equipped with Reed special alloy RAZOR BLADE Wheels, which cut with remarkable ease, leave little burr, and have a long life of useful service.

A sample cutter for test and trial may be ordered on memorandum invoice, to be paid for if retained or returned for credit if unsatisfactory. Try it once, and you will use no other.

REED MFG. COMPANY
1436 W. 8th Street • ERIE, PA.

Whether you gave a sales receipt or not, when requested, you must give a sales receipt showing your name and address, the date, the service supplied and the price charged.

* * *

It is felt that these main "guide posts" will give most service shops most of the information they need for general guidance to compliance with Maximum Price Regulation No. 165, as amended.

A model statement of maximum prices prepared specifically as a guide for the electrical and gas appliance trade in meeting the filing requirements of the service regulation is appended. *Prices shown are for the purpose of illustration only,* and are not ceiling prices set by OPA. Each establishment must determine its own ceiling prices.

Statement of Maximum Service Prices Appliance Sales and Service Company 17 Blank Street Anytown, Ohio

In all cases the prices listed below were the highest charged during March.

Prices for services regularly supplied at a fixed charge are as follows:

Domestic Irons	
Element replacement	2.00
Terminal replacement	.75
Thermostat knob replacement	.70
Thermostat replacement	2.00
Percolators	
Element replacement	2.25
Refinish inside	2.00
Thermostat replacement	1.40
Valve and tube replacement	1.00
Roasters	
Element replacement (bottom)	2.25
Element replacement (side)	2.50
Pilot lamp replacement	.50
Thermostat replacement	2.00
Toasters	
Element replacement	1.50
Waffle Irons	
Element replacement	1.50
Grid replacement	1.75
Thermostat replacement	1.75
Terminal replacement	.75
Refrigerators	
Replacing gasket up to and including 6 cu. ft.	2.00
Replacing gasket over 6 cu. ft. up to and including 8 cu. ft.	3.00
Refinishing up to and including 5 ft. refrigerator cabinet	10.00
Refinishing 6 ft. refrigerator cabinet	12.00
Refinishing 7 ft. refrigerator cabinet	13.00
Refinishing 8 ft. refrigerator cabinet	14.00
Vacuum Cleaner	
Replacement of belt (to be brought in and picked up by customer)	.75
Electric Ranges	
Replacing 6" element	7.00
Replacing 8" element	8.50
Gas Ranges (any make)	
Cleaning and adjusting burners	1.50

We do general repair and maintenance work on all types of electric and gas appliances. On small appliances we make a flat charge which includes parts and labor. Articles must be brought in and called for by customer.

In March 1942 repair prices on major gas and electric appliances were based upon a fixed charge of $1.50 per hour for labor (this charge included overhead or indirect cost and profits), with a minimum charge of $1.00 per call within city limits. Outside of city limits we charged 10 cents for each mile or fraction thereof for one way. Prices for materials, labor, and mileage were listed separately on our repair bills. We charge for parts supplied in connection with service as follows:

1. Where appliance was of a make we sold, we used manufacturer's list price in catalog in effect March 1942.

2. Where other make appliances were serviced or regular parts were substituted we took our March cost and added 66⅔ margin (this charge represents our indirect cost and profits) to arrive at price to charge customer.

Construction Tool Inventory Ordered

Owners of Used Equipment Given Thirty Days to File Reports With W.P.B.

All owners of used construction equipment will be required to register their equipment with the War Production Board so that an inventory, necessary to the war program, can be made, the Director General for Operations ordered September 1st.

Under the terms of Limitation Order L-196, any person who owns used construction machinery must file within thirty days on W.P.B. Form 1159 a report showing the type and location of the equipment in his possession.

The types of equipment covered by the order are listed in Schedule "A". It is estimated that there are approximately 500,000 pieces of used equipment in this country, much of which is idle because of the absence of a co-ordinated market place for buyers, sellers, lessors and lessees. The inventory is intended to rectify this situation.

The purpose of the inventory is to assist essential users to negotiate for the purchase or lease of used equipment and thus permit almost all new equipment to be delivered for war work.

The order affects all owners of used equipment but has no bearing on manufacturers of new equipment.

SCHEDULE "A"

Buckets, clamshell.
Buckets, concrete.
Buckets, dragline.
Buckets, orange peel.
Buckets, scraper (bottomless) for dragline operation.
Buckets, Shovel.
Cranes, crawler mounted power.
Cranes, tractor mounted power.
Cranes, rubber tire mounted power.
Discs, road.
Ditchers, blade.
Ditchers, ladder.
Ditchers, wheel.
Dragline, see cranes.
Draglines, slack line.
Draglines, walking.
Dredges & dredge equipment.
Drilling machines, earth & rock blast hole drills.
Drilling machines, earth & rock core drills.
Drilling machines, earth & rock jack hammers.
Drilling machines, earth & rock drills.
Earth boring machines.
Excavators, see Power shovels.
Graders, blade or pull type earth moving.
Graders, elevating earth moving.
Graders, self-propelled earth moving.
Graders, under-truck earth moving.
Hammers, pile.
Rollers, road, tamping.
Rollers, road tandem.
Rollers, road, three wheeled.
Scrapers, carrying or hauling, both drawn and self-propelled.
Shovels, crawler mounted power.
Shovels, rubber tire mounted power.
Shovels, tractor mounted power.
Batching plants, contractors.
Bins, construction material.
Conveyors, construction material belt.
Crushers, construction material asphalt.
Crushers, construction material cone.
Crushers, construction material gyratory.
Crushers, construction material jaw.
Crushing plants, other than stationary, construction.
Distributors, bituminous.
Finishers, bituminous.
Hoists, contractors (other than tractor mounted).

Loaders, portable bucket type (other than coal).
Mixers, bituminous.
Mixers, concrete agitator & Truck.
Mixers, concrete construction.
Mixers, paving.
Plants, asphalt.
Pumps, concrete.
Screening plants, construction material (other than stationary).
Washing & screening plants, portable.
Winches, contractors.
Track-laying tractors.
Angledozers.
Bulldozers.
Tractor operated control units.
Internal combustion engines—Diesel and gasoline unattached.

Refrigerators

On September 5, Amendment No. 2 to Limitation Order L-5-d was issued by the War Production Board which releases certain domestic mechanical refrigerators, including gas refrigerators, from previous freezing orders. The order specifies the conditions under which they may be transferred and sold.

Under the amendment, utilities may now—

(1) Transfer gas refrigerators in stocks freely between properties.

(2) Sell gas refrigerators to an ultimate consumer who signs the following statement:

"The domestic mechanical refrigerator being transferred is for my personal use (or for the use of my family, or my tenants). I have no other domestic mechanical or ice refrigerator at any disposal (or, I have disposed of any domestic mechanical or ice refrigerator which has been at my disposal since February 14, 1942, to a dealer or consumer).
Date .....(Signed) ....."

The above statement can be prepared in local properties for the use in connection with refrigerator sales.

The conditions permit customers to qualify by disposal of their old refrigerator to a dealer or another consumer and, after they have disposed of their old refrigerator, may then buy a new refrigerator upon signing the statement.

Ceiling prices filed with the local rationing Boards are to prevail and under no circumstances should a refrigerator be sold in excess of these ceiling prices.

Utility Facilities

Installation of utility facilities using critical materials in defense-rated projects will be expedited under terms of an amendment to P-46 announced September 14 by WPB. Order P-46 covers maintenance, repair and supplies for utilities.

The amendment provides that suppliers of utility services to projects rated A-5 or better which require iron, steel or copper for their construction will be granted the highest rating assigned to other equipment for the project which also uses iron, steel or copper.

All other required utility facilities will be assigned the lowest rating granted to materials for the project, so long as the rating is not below A-5.

Gas Well Drilling Stopped in Kansas-Oklahoma field

On recommendation of the Office of Petroleum Coordinator for War, the Director General for Operations, WPB, September 3, ordered a stop to the further drilling of gas wells in the Hugoton gas field in Kansas and Oklahoma except in instances where specific authorization is given by the Director General.

Issued as Supplementary Order M-68-6, the order is intended to conserve critical materials used to drill, complete, or provide additions to any well in that field.

BARBER BURNERS
For ALL Gas Appliances

We supply Burner Units to hundreds of leading gas appliance manufacturers. We will design and furnish the proper size burner, with the proper jets, for YOUR appliance. BARBER Burners give complete combustion on natural, manufactured, bottled or Butane-Propane Gas.

Latest Catalog on request.

THE BARBER GAS BURNER CO.
3704 Superior Ave., Cleveland, Ohio

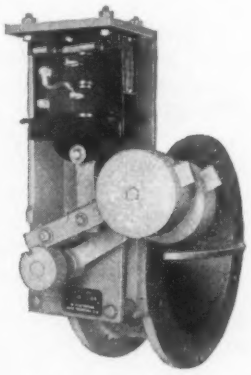
CRUSE-KEMPER COMPANY
STEEL PLATE CONSTRUCTION
AMBLER, PA.
GAS HOLDERS
HOLDER INSPECTION
RIVETED OR WELDED FABRICATION & ERECTION
TANKS, BINS, FLUES PURIFIERS, WELDINGS

Water, Coal and Oil Gas Plants
Gas Benches
Retort Oil-Gas Process
High B.T.U. Substitute for Natural Gas
Liquefaction Storage Plants
Industrial Furnaces
THE GAS MACHINERY CO.
16100 Waterloo Rd. Cleveland

New Equipment and Appliances

Solenoid Operated Butterfly Valve

Constructed of any metal alloy and in various sizes for air, gas, steam, oil, hydraulic and other services, this solenoid operated butterfly valve provides two-position control—either automatic opening or wedge-tight shut-off in case the electric power fails or is turned off due to any war emergency. In an open position the butterfly vane is held open by the magnetic action of the



R. S. Butterfly Valve

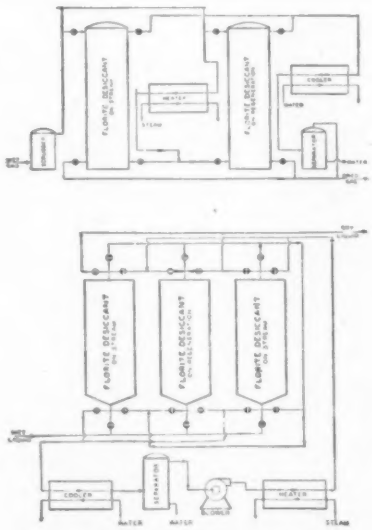
solenoid. When the electric power is shut off the trigger is tripped and the counter weight closes the butterfly vane by gravity, wedge-tight against the body of the valve.

In case of fire due to incendiary bombing, for instance, the valve in a gas or chemical line would be set for automatic closing. Should explosive or poisonous gases escape, automatic opening of an air pressure line would minimize the danger of personal injury or property damage.

Made by R. S. Products Co., 4530 Germantown Ave., Philadelphia.

New Drying Agent

Florite Desiccant, a new granular drying agent for gases and liquids, has recently been placed on the market by the Floridin Company, 111 Liberty Street, Warren, Pennsylvania. This product has not only been accepted as satisfactory in a variety of industrial processes requiring bone dry gases and liquids, but has also proved economical in many installations where high drying efficiency is not ordinarily demanded. Among the products now being successfully dehydrated are natural gas, propane,

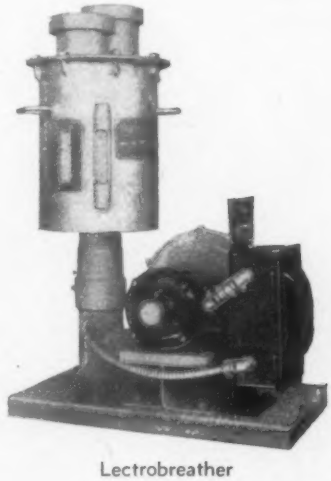


Upper—Dehydration plant for gases.
Lower—Dehydra ion plant for liquids.

gasoline, air, nitrogen, and carbon dioxide. It may also be used in breathers for storage tanks, to dehumidify air in air conditioning systems and to dehydrate refrigerants. Descriptive literature available on request.

The "Lectrobreather"

Lectrobreathers, developed by Pittsburgh Lectrodryer Corporation, 1008 32nd Street, Pittsburgh, Pa., are used to prevent the entrance of



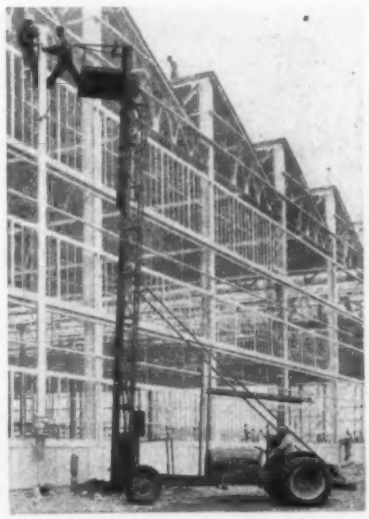
Lectrobreather

atmospheric moisture into oil and chemical tanks.

They permit only dry air to enter the tank when it is emptied or when air enters due to temperature drops. Air leaving the tank, being thoroughly dry, has a partial reactivating effect which makes possible long periods between reactivations. They are mounted either directly on the tank or piped to it and are equipped with a color indicator for determining when reactivation is needed or when it is complete. Where required for several tanks, the standard practice is to use one unit on each tank and a central reactivator for all breathers. The reactivators are built for electric operation as standard for all units or for steam operation on the two larger units.

Telescopic Stacker

Lewis-Shepard Sales Corporation, 245 Walnut Street, Watertown, Massachusetts have issued Bulletin 30-203 on their forty foot telescopic portable elevator for use on maintenance and construction work. It gives the user the advantages of a portable elevator, plus the effect of



Portable Stacker

a rapidly moved staging, inside or out. It not only raises materials for installation or lowers them for removal; but it also gives generous platform footing as well.

Specifications include: Capacity, 1500 lbs. Overall Height, 40′ 4″. Platform, 36″ long by 72″ wide. Hoisting Unit, 3 HP 110 V. DC Current. Lifting Speed, approximately 30′ per minute. Push Button Control. Slack Cable Platform Locking Device.

News of the Gas Industry

Gas Change-Over Under Way in Several Michigan Cities

Natural gas arrived in Pontiac August 31, and the job of changing-over this important center of wartime production is now well under way.

Pontiac is being changed over in two steps. First, gas burners are being adjusted to accommodate a mixture of natural gas and manufactured gas. Later, they will be adjusted for 100 per cent natural gas. The job will be completed, it is expected, during the first half of October.

The Consumers change-over army of trained service men then will move on to other communities of the Pontiac Division—Birmingham, Royal Oak, Ferndale and Mt. Clemens, among others. A few Pontiac Division communities were changed-over before Pontiac itself was reached.

All change-over operations to date have been carried on with natural gas from Michigan fields. But a connecting link in the pipeline bringing natural gas from the Texas Panhandle is approaching completion, and eventually the major portion of the gas burned in the Pontiac Division will be Texas gas.

Construction of the branch pipeline that will run west from Chelsea Junction through Jackson and Marshall and terminate in Kalamazoo is expected to begin by October 1st. The contracting company to which the job was awarded by the Panhandle Eastern Pipeline Company already has begun its engineering work and some equipment has been moved to the point where work will be started.

It is hoped to turn natural gas into the mains of Jackson, Marshall, Kalamazoo and neighboring communities either before the end of the present year or early in 1943.

Robertshaw Thermostat Company Awarded E Flag

Employees and officials of the Robertshow Thermostat Company made the official award of the E flag for the plant's war production achievement a memorable event in Youngwood. Presentation of the flag was made on Saturday, September 12, in the presence of many distinguished officials of the Army, Navy and Sttte and Federal Governments. Individual lapel pins, symbolizing production leadership, were presented to each employee.

An impressive program included participation by an Army band, local military and civic organiztions and civic authorities. The ceremonies were broadcast over Station WHJB.

The award gives Youngwood a place on the honor roll of cities distinguished for outstanding cintribution to the nation's war effort. High praise was given to the Robertshaw organization by Under Secretary of War Patterson in notifying the company of the award.

"The Army and Navy are proud of the achievement of the men and women of the Robertshaw Thermostat Company," he wrote. "The patriotism which you and your employees have shown by your remarkable production record is helping our country along the road to victory. May I extend to the Robertshaw Thermostat Company my congratulations for accomplishing more than seemed reasonable or possible a year ago."

The achievements referred to in the congratulatory letter include, according to H. T. Ryan, Vice President of Robertshaw, a 95% conversion of the plant to war production, the erection of new buildings, and even the conversion of the sales force into war production craftsmen. Mr. Ryan explained that the company's half century of high precision manufacturing had given its organization exceptional skill which was readily transferred to record achievement in production of the delicate precision parts for Army and Navy equipment.

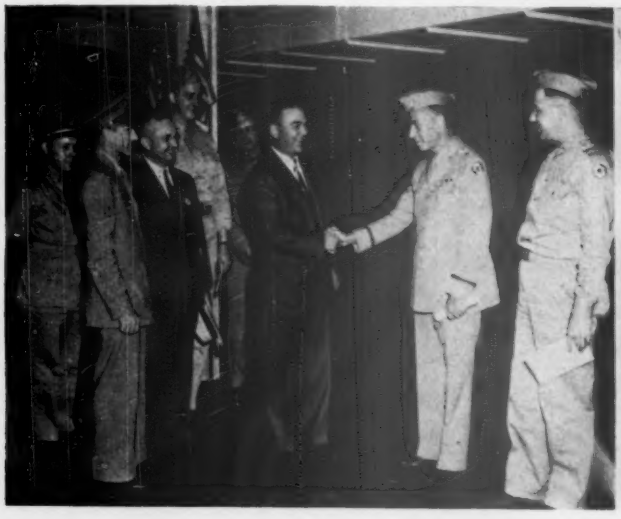
"Death Sentence" Order Cites Two Gas Concerns

The Securities and Exchange Commission initiated "death sentence" proceedings Sept. 25th under the geographical-integration and corporate-simplification provisions of the holding company act against Community Gas & Power Co., American Gas & Power Co. and their subsidiaries.

A hearing was set for Oct. 27 and the companies were given to Oct. 20 to file answers to a long series of allegations contained in the preamble in the order. Subsidiaries affected by the order are Minneapolis Gas Light Co., Birmingham Gas Co., Savannah Gas Co., Jacksonville Gas Co., St. Augustine Gas Co., Lowell Gas Light Co. and Bangor Gas Co. All are direct subsidiaries of American Gas except Lowell, which is a direct subsidiary of American Utilities Associates. The latter is a holding company, a subsidiary of Community as well as a direct subsidiary of American Gas.

Left: General Minton congratulating John A. Robertshaw, President, upon receiving Army-Navy E Award. Reading left to right: Lt. Stone, U.S.N.R.; Captain Corgan, Army Inspector; C. P. Grace, Factory Superintendent; Lt. Riesmeyer, U.S.A., Captain Rial, U.S.A., John A. Robertshaw, General Minton and Major Redmond.

Right: General Minton making presentation address Army-Navy E Award at Robertshaw Thermostat Company.



Press Preview of "Nutrition in Industry" at Servel Inc., Evansville, Ind.

Food editors of leading magazines of the nation, representatives of prominent trade journals, and defense health authorities, assembled August 31st at Evansville, Ind., for a special press preview of the new "Nutrition in Industry" Program which Servel, Inc., is making available to war plants of the country through gas utility companies to help speed up war production, joined in expressing unqualified approval of the program. Publications represented included industrial, factory and restaurant magazines, as well as nationally known women's magazines.

"Victory Lunch" at the Servel cafeteria during the "Nutrition in Industry" preview.

The all-day meeting gave the preview group an opportunity to obtain first-hand information not only on Servel's "Nutrition in Industry" plan for war industries everywhere, but also on Servel's pioneering nutrition program for its own workers in its Evansville war plant, on which the national industrial nutrition program is based.

The gathering was remarkable for the unusual unanimity of favorable opinion expressed by all fields represented, and by the keen interest displayed in the practical application of the "Nutrition in Industry" Program, as demonstrated particularly in Servel's plant cafeteria, where the visitors had lunch and talked with many of the workers.

C. V. Sorenson, chairman of the Refrigeration Committee of the American Gas Association said, "Servel has laid very securely the foundation stone. The next step is to get the support of the public. I think that will materialize much more rapidly if the press will fulfill its mission by telling the public about it. The third step is the field work. The gas industry can use its trained home economists and render a real service here. I think you will find the industry is perfectly willing to get busy and do this field work, providing the press does its job, and Servel continues with its fine work."

Louis Ruthenburg, president of Servel said: "We know that if the war is to be won, we must have properly applied manpower, and a great deal of that application must be in industry. Anything that can be done to speed up war production and reduce lost manhours is a real contribution to the war effort. That is what is motivating Servel and the gas industry in presenting the "Nutrition in Indusry" Program.

Robert J. Canniff, Advertising and Sales Promotion Manager, under whose supervision the "Nutrition in Industry" Program was developed, stated: "The 'Nutrition in Industry' Program utilizes the trained home economists, the special demonstration facilities, and the wide foods and nutrition experience of the gas utility companies, placing them at the service of the war plants in their respective communities. It also utilizes the wide contacts of the gas industry. Through the Home Volunteer Program alone, we are now reaching some 17,000,000 families in 450 different communities."

Effect of National Advertising Campaign

Coincident with the appearance in *Life Magazine* of September 14th of the gas industry's first advertisement of the 1942-43 series, Thomas F. Ward, advertising manager of *Life*, addressed the following letter to a large number of advertising executives:

"To use one of the favorite clichés of the day, 'They're cookin' with gas.'

"And to explain, I mean, in this instance, that the gas industry of America is doing a real job in working for victory.

"This thought is the theme of a stirring message from the gas industry to modern, patriotic citizens—a message designed to tell them how 'The Wonder Fuel for Cooking Now Speeds War Production.'

"Appearing in *Life* in the current issue, this eloquent story will be seen by millions of people . . . for nearly 22,000,000 people read each issue—read it and are influenced by it.

"And, too, the ad is bound to carry particular weight, because *Life* readers are conditioned to such vital messages as this by *Life's* presentation in unique word and picture fashion of the news about everyday living, about the world at war, about the United States' production effort.

"The gas industry, I believe, is doing an inspiring and farsighted job in telling Americans this story—to help teach them the need for wise consumption of gas, and to help preserve the place of this great American Industry in the life of our country."

Florida Power & Light Co. Men in War Service

C. B. Vick, industrial sales manager for the Florida Power & Light Company, has been commissioned a Lieutenant in the Navy and ordered to report on September 1st at Cornell University for special training.

Mr. Vick is a graduate of Georgia Tech, and was with General Electric Company in Schenectady, and Atlanta, before coming to Florida.

Lieut. (j.g.) Edward M. Grout was enrolled on September 1 in the U. S. Navy Training School at Cornell University, Ithaca, New York.

Lieut. Grout recently received his commission as a lieutenant (j.g.) in the Navy. He was assistant advertising manager for the Florida Power & Light Company. He is a graduate of the University of Florida, and has been active in the affairs of the Miami Junior Chamber of Commerce, Miami Advertising Club, local Chi Phi chapter and the University of Florida Alumni Association.

THE STACEY MANUFACTURING CO.
Engineers Fabricators Constructors
• Gas Holders • Gas Plant Equipment • Steel Plate Construction •
GAS HOLDER INSPECTION SERVICE
Cincinnati — Ohio
91
STACEY SINCE 1851
Years

Federal Power Commission Authorizes Installation of Three Compressor Units

The Federal Power Commission on September 8th announced its order issuing a temporary certificate of public convenience and necessity to the Northern Natural Gas Company, with principal offices in Omaha, Nebraska, authorizing the installation of three compressor units totalling 3,100 horsepower in compressing stations in Kansas and Nebraska and the construction of approximately 31.4 miles of 20 and 24-inch pipeline to loop the company's existing natural gas line in the State of Kansas. Work on the new facilities is to be started by November 1, 1942.

The order states that the company has on hand the necessary equipment and material for the compressing installations, and part of the pipe, and that the War Production Board has granted the company certain preference ratings for the pipe and material needed to complete the loop lines.

The temporary certificate specifically provides that construction shall commence on or before November 1, 1942, and be completed on or before June 1, 1943, unless the time is extended by Commission order; that progress on the construction and installation shall be reported periodically to the Commission; and that the issuance of the certificate is without prejudice to the Commission's authority in other matters.

Kansas Gas Line To be Extended

Northern Natural Gas Co., Omaha, Nebr., was recently authorized by the federal power commission to construct 31 miles of 20 and 24-inch pipeline to loop its existing natural gas line in Kansas. The concern also was authorized to install three compressor units totaling 3,100 horsepower in compressing stations in Kansas and Nebraska. Work on the new facilities, for which exact locations were not given, is to be started by November 1.

New War Gas Extinguisher

The O. H. Adams Company, Milwaukee, Wis., has announced a new fire and war gas extinguisher.

The Adams' Extinguisher is recommended by the manufacturers as an effective fire extinguisher and as a decontaminator for the three major war gases:

Chlorine, which affects the lungs (highly pungent odor)

Phosgene, which affects the lungs (musty hay, green corn odor)

Chloracetophenone—tear gas (apple blossom odor).

This new product has been successfully demonstrated in combating Automotive Airplane, Industrial and Marine Fires, and is effective for Household and Factory Fires, Gasoline, Cleaners, Oil, Paint and Grease Fires. The product is non-injurious and lasts indefinitely.

One cubic inch of Adams' Fire Extinguisher upon contact with fire, has produced over 1000 cubic inches of fire-smothering gases.

R. A. Chaffee, of Clark Bros. Is Air Corps Lieutenant

Rupert A. Chaffee, for four years engaged in engineering work for Clark Bros. Co., Inc., of Olean, N. Y., resigned his position in July to enter military service and has been assigned to the Academic Department of the Army Air Forces Technical Training Command, at Sheppard Field, Wichita Falls, Texas, with the rank of Second Lieutenant.

R. A. Chaffee

Lieut. Chaffee graduated from Ohio State University, in 1938, with the Mechanical Engineering degree, and immediately entered the employ of Clark Bros. in the Experimental and Testing Department. Two years later he became an Erection Engineer for the company covering the Midcontinent and California oil fields, serving in this capacity until his resignation in July.

F. A. Smith Elected to Controllers Institute

Frederick A. Smith, controller and director of the Canadian Western Natural Gas, Light, Heat and Power Company, Calgary, Alta., has been elected to active membership in the Controllers Institute of America, a technical and professional organization of controllers devoted to improvement of controllership procedure.

10 Suggestions for Getting Out Industrial Scrap

1. Head up the campaign by appointing an able executive of the company, armed with authority to act.
2. Use posters, illustrations, pay-envelope stuffers, and all other publicity means to enlist all employees in scrap campaign.
3. Comb plant and yards for dormant scrap and unusable and abandoned equipment.
4. Survey all plant equipment, particularly idle, standing or discarded machines.
5. Classify and segregate scrap and supervise its handling.
6. Make each foreman responsible for preventing spoilage and waste in his department.
7. Report promptly equipment which is obsolete. If equipment has not been used in three months, and it can't be proved that it will be used in the next three, turn it over where it can be used . . . or scrap it.
8. Salvage usable parts from equipment marked for scrapping.
9. Speed return of scrap to mills and refineries through existing channels. Report regularly on collections of scrap to the Industrial Salvage Committee set up by the War Production Board in your community.
10. Enforce monthly re-checks in every department to find scrap material previously overlooked.

Florence Matheny Wins Home Service Award

Florence Matheny, Southern Counties Gas Company home service director with headquarters in Monrovia, California, placed second in the McCall Magazine Awards Contest for gas utility home service departments in the United States and Canada.

The award of $50, together with a plaque, will be presented to her at the American Gas Association's annual meeting in Chicago on October 5 and 6. She is a member of the A.G.A. Home Service Committee.

Her paper entitled "Home Service Marches On," which tells in detail of the contribution of the company's home service department to the advancement of better living in the home, brings national recognition to the home service activities of the Southern Counties Gas Company.

GOODMAN
USED SINCE 1897
Z HANDLE & LOCKING SLEEVE
GAS MAIN STOPPER

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

Birmingham Gas Co. Gets Approval for Expansion Program

To meet anticipated wartime demand for gas, the Birmingham Gas Company has received approval of the War Production Board for an expansion program that will add approximately 11,500,000 cubic feet a day to its capacity.

The new program is contingent, however, upon ability to get materials. It will involve an expenditure of about $200,000 and is scheduled for completion by Jan. 1 or 15.

The plan calls for obtaining a supply of gas from the Woodward Iron Company approximating 4,500,000 cubic feet a day. A plant for purification of the gas, compressors to move the gas into the lines and two miles of 14 inch cast iron pipe will be used.

The increase in the line capacity from the Alabama By-Products Corporation, totaling about 7,000,000 feet a day, will require about two and a fourth miles of pipe and fittings.

Gibbons Appointed to Staff of Wailes Dove-Hermiston

J. E. B. Gibbons has been appointed special representative to the oil and gas industry for the Wailes Dove-Hermiston Corporation, Westfield, N. J., according

Photo Blank and Stoller

J. E. B. Gibbons

to an announcement by W. H. T. Thornhill, Vice President. Mr. Gibbons was formerly associated with the Dresser Manufacturing Company, and the Victualic Company of America.

W. M. Jacobs Elected to National Adv. Committee

W. M. Jacobs, general superintendent of sales, Southern California Gas Co., Los Angeles, has been elected to the gas industry's Committee on National Advertising, representing participating companies in the State of California, and he has also been appointed to the National Advertising Copy Committee. Mr. Jacobs succeeds J. S. Spaulding, advertising manager of the Southern California Gas Co., who is now a Captain in the Army Air Corps.

California Gas Companies Adopt Wage Adjustment

A $10.00 per month cost of living wage adjustment for all employees earning less than $300 a month has been announced by Southern California Gas Company and Southern Counties Gas Company. Effective as of August 16, the raise is a boost in hourly rates of 5.77 cents. The adjustment is designed to aid employees in meeting the rise in the cost of living which has occurred since the last general increase a year ago, according to company spokesmen.

Miss McQueen Appointed to Home Volunteer Advisory Board

In furthering its wartime services to the gas industry, Servel, Inc., has appointed Miss Jessie McQueen, Home Service Counsellor of the American Gas Association, as a member of the Home Volunteer Advisory Board. Miss McQueen is the second member to be appointed to the board; she joins Miss J. Ernestine Becker, nationally known nutrition authority who heads the board.

Miss McQueen will represent the gas industry and home service groups on the board, counseling in the adaptation of plans and materials on nutrition and home conservation. The prime purpose of the board is to correlate and organize along practical lines the use of food and nutrition material developed by all government, state and volunteer agencies.

Miss McQueen has been Home Service Counsellor for the American Gas Association for thirteen years, and is personally acquainted with home service programs of nearly every gas company in the United States. Much of the industry's wartime home service activities have been developed with her aid and assistance.

INDUSTRIAL GAS BOILERS
GARMENT PRESS BOILERS
100 lbs. ASME Code
¾ to 45 H.P.

P. M. LATTNER MFG. CO.
MAIN OFFICE
CEDAR RAPIDS, IOWA

Worthington Appoints R. J. Laidlaw Manager At Cleveland

Worthington Pump and Machinery Corporation announces the appointment of Mr. R. J. Laidlaw to the position of Manager of its Cleveland district office. Mr. Laidlaw will succeed Mr. A. J. Klug, who

R. J. Laidlaw

will now devote his entire time to special work with certain important industries in the Cleveland district.

Mr. Laidlaw has been connected with the Worthington organization in various capacities since his return from overseas in 1919 from active service with the 32nd Division of the 120 M. G. Battalion in World War I.

Maintenance Hints for Two Cycle Gas Engine Driven Compressor

In conveniently arranged form, Clark Bros. Co., Inc., Olean, New York, manufacturers of engines and compressors, have just published a booklet entitled, "Maintenance Hints for Clark 'Angle' Super Two Cycle Gas Engine Driven Compreessors."

Briefly, it considers — 1. The *proper maintenance* of the Clark unit and *when* it should be done. 2. The troubles which operators sometimes encounter and the methods to solve them. Also there is a section comprised of 23 Do's and Don'ts which every plant engineer and maintenance man should know in order to reduce maintenance and repair costs.

This booklet is available upon request.

Machold Elected President Niagara Hudson Power Corp.

Earle J. Machold was elected president and a director of Niagara Hudson Power Corporation at the meeting of the board of directors of the corporation Sept. 25th to succeed the late Alfred H. Schoellkopf.

Mr. Machold has been closely identified with the operations of the Niagara Hudson System for the past twelve years as counsel for the companies.

Obituary

WILLIAM E. CLOW

William E. Clow, chairman of the Board, James B. Clow & Sons, died September 14th at Chicago, Ill., at the age of 82.

With his father, Captain James Beach Clow, William E. Clow—at the age of 18 years, formed a partnership and started the new firm under the name of James B. Clow & Son. Later—as brothers of William: Charles R., Harry B., and James C., entered the company—the name of the firm was changed to James B. Clow & Sons.

From a humble beginning the firm, always under the guiding hand of William E. Clow, showed a steady growth, until today it is recognized as one of the largest jobbers of plumbing and heating supplies in the United States, as well as one of the largest manufacturers of cast iron pipe.

To have weathered the storms through a business career of more than sixty years might not, of itself, be such a great accomplishment—but for a youth of 18 years to embark in business on borrowed capital of $300, repay that loan within a week and build that business into one of the greatest in its field, is indeed a great accomplishment.

William E. Clow was the last of the early pioneers of the plumbing and heating business who contributed so much to the development of the industry.

A. C. HOWARD

A. C. Howard died August 31, 1942, at the age of 62. Mr. Howard was the son of Admiral Thos. Benton Howard, U.S.N., and Annie J. Claude Howard. He graduated from the U. S. Naval Academy in 1900. In 1898, served in Spanish-American War on U.S.S. Newark. Received two medals, the Sampson Medal and the Spanish-American War Medal. Resigned from navy in 1900. Served as Cadet Engineer from 1901-1911 with United Gas Improvement Co. in Philadelphia, becoming Assistant Superintendent. From 1911 to 1927 he served as Gas Engineer for the United Gas & Electric Engineering Corporation and became Vice President and their Consulting Engineer, also a director. He was 1st Vice President of the Southern Gas & Electric Corporation, Vice-President and General Manager of the Dixie Gas & Fuel Co., headquarters at Houston, Texas. He was connected with the following companies: Director of the El Paso Natural Gas Corporation; Vice-President and Director of the Eastern States Gas and Power Company; President and Director of the Sumter Gas and

A. C. Howard

Power Co., of Sumter, S. C.; Treasurer and Director of the Anderson Gas & Utilities Co., and director of the Greenwood Gas and Fuel Company. He became a Director of the Oklahoma Natural Gas Corporation; prepared natural gas reports for the Electric Bond and Share Company on properties in New Orleans, La., Memphis, Tenn., and Jackson, Miss.; appraised properties of the Southwest Gas Company, San Antonio, Texas. Mr. Howard had operating experience in some 15 states and appraised properties for rate making, purchase or bond purposes in 20 states and the province of Ontario, Canada. He invented the "Howard Charger," used on many water gas sets. He was in charge of bringing natural gas into Monterrey, Mexico, Houston, Texas, etc. In fall of 1930, Mr. Howard returned to New York as Engineer for the Eastern States Gas Company. He retired in 1933, returning to Maryland and settling in Annapolis.

ALFRED H. SCHOELLKOPF

Alfred H. Schoellkopf, president of Niagara Hudson Power Corporation, died in New York on September 9th after several months' illness. He was 49 years old.

Mr. Schoellkopf, regarded as one of the outstanding public utility leaders of the country, has been president of Niagara Hudson Power Corporation since 1933, and previously had been president of Buffalo, Niagara and Eastern Power Corporation since 1929. He has been associated with the Niagara Hudson System and its predecessor companies for the past 27 years.

Mr. Schoellkopf was chairman of the New York State Board of Social Welfare and president of the Welfare Council of New York City, and was formerly chairman of the New York State Temporary Emergency Relief Administration, having succeeded Harry L. Hopkins in that position when Mr. Hopkins became Federal Emergency Relief Administrator.

WILLIAM R. SHIPERLY

William R. Shiperly, head of the field service work of the Chaplin-Fulton Manufacturing Company, died at his home in Pittsburgh, Pa., August 9, after an illness of several months. He had been with the Chaplin-Fulton Company continuously since 1918, when he entered its employ as a machinist, and he had served in various capacities. He had charge of the testing laboratories of the company before he undertook the field work through which he became most widely known. Apart from his practical contacts with operating men on the staffs of utility companies and of industrial users of pressure control equipment, attendance at conventions and the conduct of special classes under both educational and business auspices had made him a wide circle of friends. He is survived by his wife and three children.

S. J. RATCLIFFE

Sidney J. Ratcliffe, 49, treasurer and a director of The People's Natural Gas Company, died in the Pittsburgh Hospital Sunday, Sept. 13, after a brief illness.

He joined The People's Natural Gas Company in July, 1912, and was made treasurer and a director of the company in January, 1935.

Mr. Ratcliffe also was treasurer and a director of The New York State Natural Gas Corporation and The Keuka Construction Corporation and was a director of The Lycoming Producing Corporation and The Lycoming United Gas Company. He was a member of the accounting section of The American Gas Association and chairman of the accounting committee of The Pennsylvania Natural Gas Men's Association.

EDWARD W. P. SMITH

Edward W. P. Smith, 56-year-old Consulting Engineer for The Lincoln Electric Company and a nationally known authority on arc welding was found dead Saturday morning, September 19th, in his berth aboard a train bringing him back to Cleveland from Indianapolis.

Mr. Smith, who had addressed a meeting of the American Welding Society at Indianapolis, Friday night, had boarded the train immediately after the meetng.

A veteran of more than 20 years' service with The Lincoln Electric Company, Mr. Smith had traveled extensively in the last year in the interests of the war production program.

He was born in Cleveland and was graduated from Colorado College, Colorado Springs, Colorado, with a degree in electric engineering. Before joining Lincoln Electric as a tester he had worked in the electrical inspection department of the City of Cleveland and for the Westinghouse Electric and Manufacturing Company in Pittsburgh.

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Gas Cookery in Douglas Plants

(Continued from page 23)

be necessary. But by offering properly balanced meals of really tasty food and by displaying it attractively, the company has done the job entirely on a psychological basis. A recent table checkup at one plant showed that some 92 per cent of those having lunch were eating what scientists would consider as well balanced combinations.

The Serving and Distribution Problem

The magnitude of the Douglas feeding operation presented many service and distribution problems but all of them have been solved with a rare measure of efficiency. In any of the larger plants it would have been completely impractical to install a cafeteria large enough to serve all employees at one time.

So, a meal-hour staggering arrangement was adopted. Then, as employment grew, branch cafeterias were opened. The latter are, in many cases, portable buildings which can be moved to meet the current requirements. Since capacity of the central kitchens was designed to accommodate expansion, no new preparation difficulties were involved. It was just a case of getting the food to the outer units. Insulated food carts meet that requirement.

The present plan is to bring the main cafeterias just as close to the most important production area as possible. In one new plant, the cafeteria is situated in a glass lean-to right on one side of the main production floor. In another, it's on a mezzanine above the main production floor.

Douglas officials believe that time for eating is just as important as good food. If a man has to spend a good part of his lunch hour getting to and from the cafeteria—which would have been the case in these many-acre plants—he couldn't avoid rushing his meal. So, the food is brought just as close to his work bench as possible—either with a conveniently located main cafeteria or a branch.

This time angle was also considered in designing the serving lines. One of the newer cafeterias has 14 lines so that workers can be whisked through in a matter of seconds. Even in the older plants, setups are so arranged that it's possible to serve from 30 to 35 people a minute.

Yes, mass feeding has been reduced to a definite science with Douglas. And, modern equipment has made possible this development.

Natural Gas Pipe Lines

In addition to the pipe lines for the transportation of petroleum, there are in the United States almost 200,000 miles of natural gas pipe lines. At the beginning of 1940, natural gas pipe line mileage totaled 190,270, as compared with 186,850 miles in 1939 and 182,320 miles in 1938. This includes transit lines, which in 1940 aggregated 84,700 miles, as well as distribution lines. Natural gas pipe lines are located in 32 States, with Ohio, Texas, California, Pennsylvania, Kansas and Oklahoma leading in mileage of such lines.

The principal use of natural gas is as a fuel, for which the demand has been greatly increased at a time when the industry's transportation problem has been complicated by steel priorities affecting pipe line construction. Technological advancements and the use of reclaimed pipe, compressors and other material have proved valuable aids in the adjustment to changing conditions.

Industrial Metering

(Continued from page 30)

proving period to use. It is conceivable that combination of mileage and time periods would best serve many locations.

Once the period has been determined, the method of proving should be considered. The following are the methods normally available.

1. **Bell type prover at the meter shop.**
2. **Low pressure flow prover at the meter shop.**
3. **Low pressure flow prover at location using gas.**
4. **Low pressure flow prover at location using air.**
5. **Critical flow prover at locations.**
6. **Test meter at location.**

The first method,—i.e. the bell-type prover,—being the method used for domestic meters, is the best known. However, the standard bell type prover is weighted for only one and one-half inches of water and counting loss through fittings, hose, and connections leaves a pressure to operate the meter which may not operate it at a rate as high as it is used in service even though it be a ten foot prover. By timing the meter being tested it can be determined whether or not the test is being conducted at a rate of flow which is as high as the maximum flow of the meter in service. It is essential that the meter be proved at as high a rate of flow as is used in service. It is usually not practical to weight five or ten foot provers for much more than one and one-half inches of water in order to arrive at a higher test rate. A twenty foot, fifty foot or hundred foot prover, of course, is desirable when a bell type prover is used to test industrial meters. Because of the high rate of drop, starting and stopping runs at the five foot or ten foot point also results in certain errors.

The second method, — i.e. low pressure flow prover at the meter shop,—offers a means by which any industrial meter of the diaphragm type can be tested at any number of flow rates up to its capacity. The actual principle of the flow prover is the same as the orifice meter and consists of an easily portable "orifice run" with straightening vanes and a thermometer well. An accurate reading of pressure is accomplished on a barometer type manometer. Air from a blower is forced through the meter and then through the low pressure flow prover. By observing the temperature, the local barometer, and knowing the coefficient of the orifice plate, the time for ten feet or one hundred feet can be computed. This is actually done quickly and simply from tables. The meter is timed and the observed time is compared to the theoretical time and the accuracy of the meter thus determined. By merely using different size orifices in the prover, any number of flow rates from the minimum to maximum can be tested. This method provides a cheap and accurate method of testing large meters in the shop beyond the capacity of the bell type prover. Its extended use awaits only a sufficient time and enough tests to convince the industry of its accuracy.

The third method, — i.e. low pressure flow prover at location using gas,—has been used for many years in testing field meters. Where industrial meters are located outside, which is fairly common in the South and West oCast areas, it is possible to use the gas and discharge it to the air. A correction must be made in this case for specific gravity of the gas. Obviously the gas discharge must be into an area that is safe. This method, of course, permits a test at location without the cost of transporting the meter back to the meter shop.

The fourth method — The impossibility of discharging gas indoors, yet the desirability of proving meters at location, leads to the fourth method,—i.e. using the low pressure flow prover at location and using air as a medium. To do this it is necessary to transport to the meter location an electric driven blower in addition to the flow prover. These are available working on 110 volt AC current, a three-quarter horsepower moter delivering 8000 cubic feet per hour against a 10″ head, thus giving the maximum flow rate for the largest diaphragm meter. Convenient connections, usually two inch stubs, should be provided in the inlet piping of the meter installation for the blower and in the outlet piping for the low pressure flow prover. In this way a test can be run at the meter location very readily. This method is relatively new but it is the writer's opinion that it offers, with proper operation, a satisfactory and cheap method of maintaining industrial meters at their highest accuracy with the least expense.

The fifth method,—i.e. the critical flow prover,—discharges gas into the atmosphere, and for that reason can be used only on meters which are located outside or where the gas can be discharged to the outside. It is necessary to have a gas pressure more than 13 pounds per square inch gauge in order to operate the critical flow prover. The principle of operation is based on the fact that the velocity of gas through an orifice cannot exceed a certain limiting value (the velocity of sound in that gas), once a certain pressure difference across the orifice is reached. It is somewhat simpler in operation than the low pressure flow prover in that the upstream pressure does not have to be observed or corrected for. This method is in fairly general use in field, town border and other stations, where gas pressure is available and gas can be discharged to the atmosphere.

The sixth method, — i.e. using a test meter at location,—depends on keeping the test meter always in proof by some means such as comparing against a bell prover in the meter shop, and then transporting the test meter to the location of the meter to be tested. If the set has been so piped, it may be possible to connect the test meter in series with the meter being tested and prove by direct comparison. Where the piping will not permit the test meter to be connected back into the line, this test will have to be made by discharging gas into the air. This, of course, requires an outside meter setting.

No matter what method of proving is used, there should be certain features considered in testing. In the matter of flow rates, the meter should be tested at one rate of flow which approximates the maximum flow rate to which the meter is subjected in service. The minimum flow rate should be low enough to insure accuracy during low load periods. It should, in general, be much lower than 1/5 of the maximum capacity rate usually used as the check rate with domestic meters. Because of the possible characteristics of the accuracy versus rate of flow curve for large diaphragm meters, a third test should be made at a flow rate approximately half way between the maximum and minimum test rate. In this way the accuracy at all rates can be determined and better measurement assured. If, in the larger meters, a meter is improperly assembled at repair, or the valves are improperly timed, the accuracy curve will not be a straight line but a curved one. If this is the case, it might be possible to have two points tested within the limits, but other points, corresponding to other flow rates, recheck the limit.

Some of the factors involved in the matter of proving industrial meters are subject to local conditions. It was felt that a summary based on a survey of a representative number of gas companies might be of interest, so Fig. V has been prepared giving proving information for the various companies.

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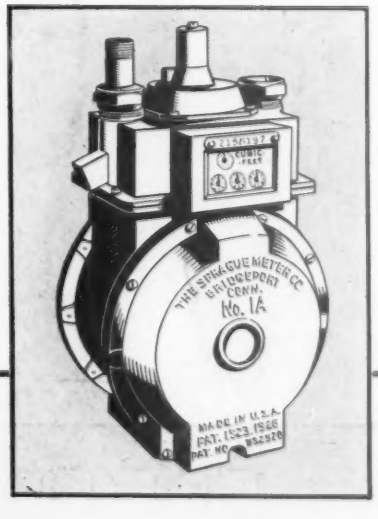

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